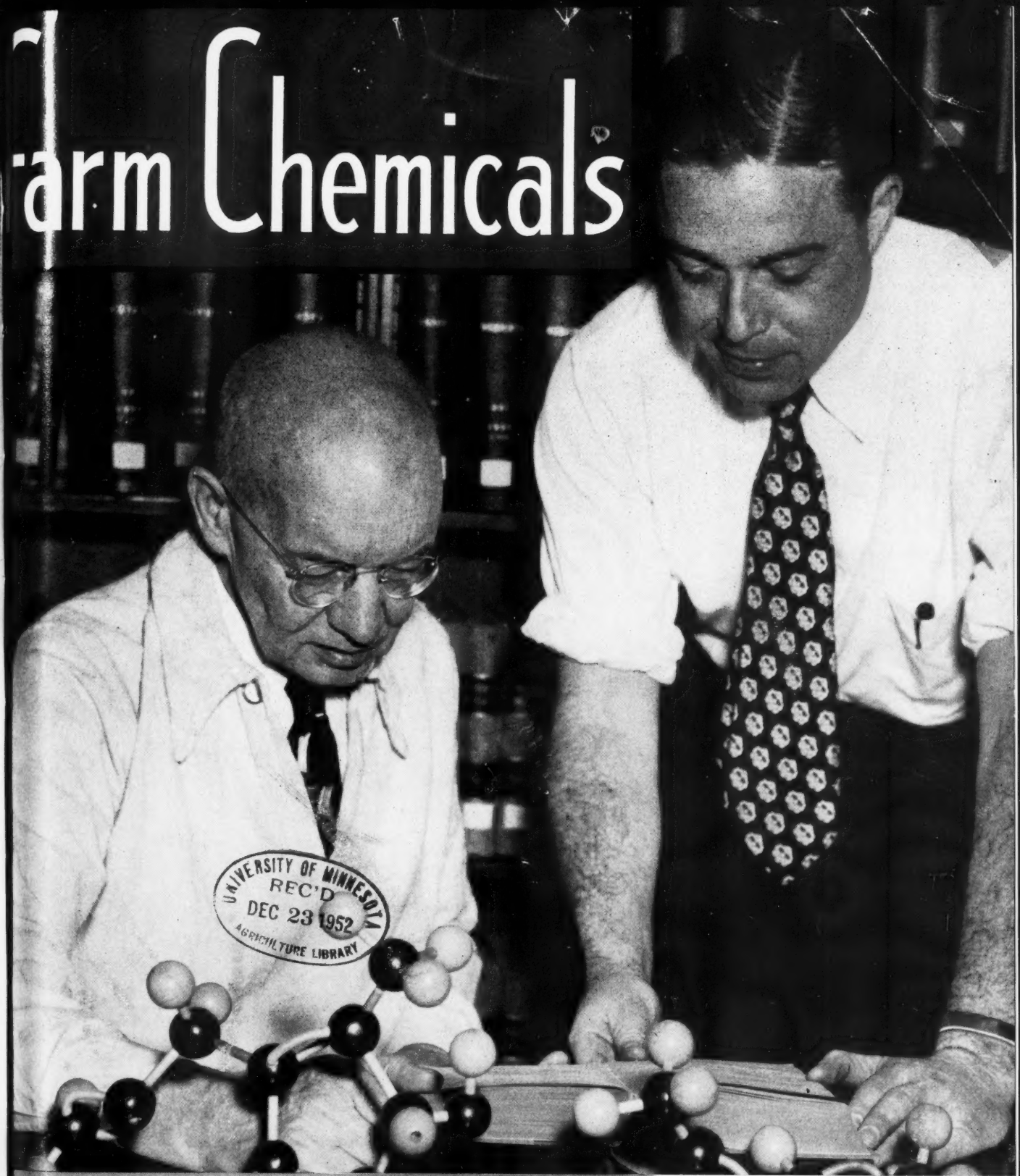
arm Chemicals



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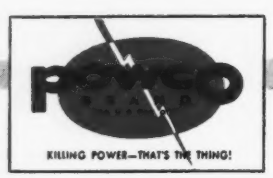

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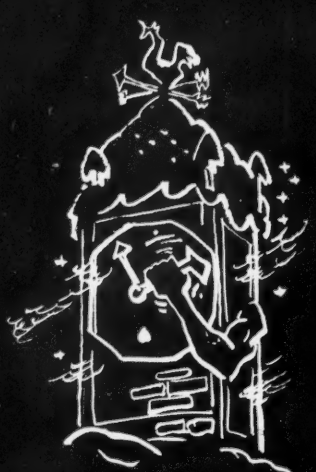
The Longest Night of the Year



Of all the days, of all the nights,
That creep with laggard tread,
No day seems so far distant
As the one that's just ahead.

They hear the distant sleigh bells
That tinkle in the night.
They hear the call that haunts us all,
Of trains on wings of flight.

They hear the watchman's muffled tread,
They see his searching light.
They resolutely close their eyes
To speed the endless night.

They hear the quarter hours chime,
They count on fingers then
And find to their near-anguish
It's but slightly after ten.

So, when at dawn they wake you
With impatience and delight—
Remember then, remember well,
They've been awake all night!

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farm chemicals

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PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 115 DECEMBER, 1952 No. 12

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Cover Story

Models of the molecular structures of synthetic pyrethrin insecticides are studied by Dr. F. B. LaForge, left, and Milton S. Schechter, chemists at the Agricultural Research Center, Beltsville, Md. For the story of one such insecticide—allethrin—turn to page 12.

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In this issue . . .

Allethrin had its big moment in the limelight three years ago. Since then not much has been heard of it. But it merits attention as an important synthetic replacement for expensive and hard to get pyrethrin. David G. Hall, of the Division of Information, Bureau of Entomology and Plant Quarantine, tells how allethrin is made and what it will do in an article on page 12.

The weather wasn't all it's cracked up to be but members of the National Fertilizer Association enjoyed themselves at Miami Beach Nov. 19–21 anyway. The occasion—the 26th annual fall convention of the association. For staff coverage of the convention and a report on the important talks given at the sessions, turn to page 17.

Labeling pesticides always is a touchy problem. The manufacturer must be sure his description tells exactly what's in a pesticide container and must give adequate warning about its toxicity and dangers, if any. For an interesting discussion of the subject, read M. F. Crass's article on page 25.

Introduction of fertilizer compounds containing no sulfur raises several problems with soils and crops. J. R. Neller gives further details on page 28.

Stories about growth from a shoestring to a big corporation aren't uncommon in the United States but they're always interesting. For the facts on one such development in the farm chemicals industry, read the story of Arizona Fertilizers Inc., on page 32.

Determining methods of analysis, always a big job for pesticide manufacturers, is one of the many phases of the pesticide field discussed by H. L. Haller in his article on page 37.

Another record for fertilizer production—this time world-wide—is presented in detail in the report of the Food and Agriculture Organization of the U.N. It appears on page 47.

Short articles on two meetings—one concerned with fertilizer safety, the other with agronomy—are reported in this issue. Fertilizer safety: page 45; agronomy: page 55.

Velsicol's new insecticide ***Heptachlor*** is gaining in popularity with pesticide formulators. For the reasons, turn to the short feature in this issue on page 51.

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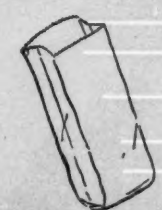

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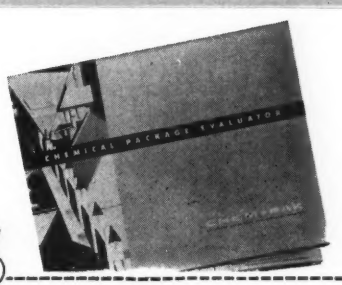

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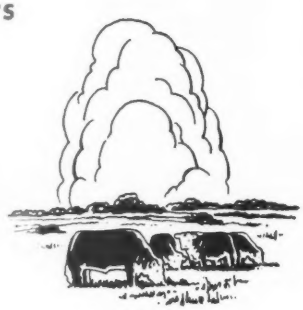

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★ our appreciation for making this—our first year a success.

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. . . Briefly Noted

Lloyd W. Miller, of North Hollywood, Cal., has been named Southwest district sales agent for the merchandising division of Monsanto Chemical Co. He will be in charge of sales of Krilium, with headquarters in Los Angeles.

More than a million dollars will be spent by International Minerals & Chemical Corp. for improvements to the Potash Division's Niagara Falls plant. A. Norman Into, vice president of the division, said the improvements will boost production by 25 per cent.

Chemical Corporation of Colorado will be back in business after an agreement with a large block of its creditors who have accepted a settlement of $300,000 in debts at one-third value. More than 225 unsecured creditors are listed. Before bankruptcy, the corporation had total assets of $532,097 and total debts of $656,456.

Plans are being completed for the mining of phosphate rock by Armour Fertilizer Works on its Polk county, Fla. property. Project will include complete facilities with washing, flotation, drying, grinding, storage and shipping units. Processed rock will be used in Armour's Bartow, Fla. triple super plant and in its other manufacturing units.

Died: Russell S. Roeller, 60, Pennsalt general sales manager. A week prior to his death Mr. Roeller was honored for 30 years service with the company at a luncheon. Chief interest during most of his career was the development of markets for bulk or tonnage chemicals and establishing long term customer relationships for these products.

Leonard V. Edwards, Monticello, Ark. has joined the Hercules Powder agricultural chemicals section. An entomologist, he will represent the company in Arkansas and Louisiana with headquarters in Dallas, Tex.

New general manager of the Southern Kraft division of International Paper is Erling Riis, succeeding J. H. Friend who recently resigned. Both are members of the company's board of directors.

Offices of Glendon Pyrophyllite and their control laboratory are now located at 1104 E. Wendover Ave., Greensboro, N. C. Mailing address: P. O. Box 2414, Greensboro. Glendon has announced that their terms are now one per cent ten days, net thirty days on their total invoice.

C. Y. Haas is now manager of the technical division of Attapulgus Clay and is located at the company's Camden, N. J. labs. He was formerly in charge of sales and technical service activities.

Captan has been selected by the Interdepartmental Committee on Pest Control as a common designation for the fungicide N-trichloromethylthio tetrahydrophthalimide. It was formerly designated as SR-406 and Orthocide. Cal-Spray, in the process of registering Captan as a trademark, has arranged to transfer it to the supplementary list in the trademark division, making it available as a common name.

Injury frequency rates in the fertilizer industry dropped slightly during the first six months of 1952 according to the Bureau of Labor Statistics. There were 19.2 disabling injuries per million man hours during this period, as compared to 24.1 in the first half of 1951.

Heavy chemicals for the chemical fertilizer industry will be carried by the import and brokerage house of Longaker & Co., of Auburn, Ind. The firm is headed by Charles T. Longaker.

CALENDAR

Dec. 10-11—Cotton Insect Control Conf. Memphis, Tenn.
Jan. 7-9—Northeastern Weed Control Conf., New York City
Jan. 19-22—Plant Maintenance Conf., Cleveland, Ohio
Feb. 9-11—Assoc. of Southern Agr. Workers, New Orleans, La.
Mar. 11-13—NACA, New Orleans, La.
Mar. 15-19—American Chem. Society, Los Angeles, Cal.

Pearsall

A legal department has been formed by Virginia-Carolina and will be headed by **John W. Pearsall,** as full-time general counsel. Pearsall was named Richmond's **"Outstanding Young Man of the Year"** by the Junior Chamber of Commerce in 1948 receiving their Distinguished Service Award. The law firm of Hunton, Williams, Anderson, Gay and Moore are general attorneys of the corporation.

Marshall Mann, agricultural sales manager for Michigan Chemical, has assumed the responsibilities of Leonard Gopp. Gopp resigned to begin operation of Philco Chemical.

New manager of Pacific Guano's southern division is George P. Bloxham. He succeeds Howard G. Conley, now assistant general manager of the fertilizer concern, with headquarters in Berkeley, Cal.

N. S. Koos & Son have announced the appointment of R. P. Koos as president-treasurer succeeding the late Edward J. Koos. Active participation in the company has been resumed by Grace A. Koos after ten years of retirement. She has been elected secretary and member of the board of directors.

Houston sales offices of Stauffer Chemical have been moved to the company plant in that city, located at 8901 Hempstead Rd. Mailing Address: P. O. Box 7222, Houston 8, Tex.

Effective November 1, Bersworth Chemical reduced the price of Versene by about 10 per cent. The versenes are used to condition water for 2,4-D sprays.

Dr. Myers F. Gribbins has been named nitrogen products manager of DuPont's polychemicals dept. Chicago sales office. He succeeds Francis M. Jornlin, now assistant section manager, with headquarters in Wilmington, Del.

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farm chemicals outlook

Report from Washington
by Fred Bailey & John Harms

Businessmen and farmers are to have more influence in Washington, replacing labor, when Republicans take the reins Jan. 20. Both have been subjected to controls . . . both have had their fill. Their combined influence is expected to emphasize the general feeling for less government control.

Overwhelming Republican victory was caused by desire for change . . . change in controls, in foreign policy, change from corruption in government.

But don't expect a sudden reversal . . . it will come slowly. Republican top echelon will move in without definite programs and policies in mind. It wants to study the situation first-hand . . . then act.

Insiders believe President Truman will take no sudden steps to change things: He is expected to make an early report to Congress when it convenes in January . . . leave action up to it. White House already has asked OPS how much it would cost to put itself out of business without disrupting the economy.

Decontrol of prices and wages most likely is to come sooner than removal of controls on production and materials. Most price-wage controls now in effect likely will be off before current law expires April 30.

Has the government over-estimated fertilizer requirements . . . in view of official forecasts of declines in net farm income for 1953? Officials who pushed for expansion of primary plant nutrient output don't think so. Industry members we've consulted agree.

Goals are realistic, we are told, because bases for setting them have not changed . . . . regardless of less farm buying power in prospect.

Government fertilizer men, standing by the goals, point out that population continues to grow at rate of approximately 2½ million annually . . . and will continue for scores of years.

Farm population is expected to continue to decline . . . at the same time total population increases. This trend indicates that each farm worker will have to produce much more than he does at present. And this means only one thing: Higher yields. There's little new land open to farming.

Each farm worker in 1952 produced enough on the average for himself and 16 others. By 1975, if the trends continue, each farmer worker will be required to produce enough for approximately 25 others.

Expansion goals may actually be on the low side . . . these same officials indicate. Future industrial needs of things that go into fertilizers have been under-estimated, they say. Also, the possibility of a big war was not considered.

Pesticide inventories are to be surveyed by the Agriculture Department. USDA has undertaken what it hopes eventually will lead to a highly accurate measure of stocks in all positions . . . a potential valuable aid to insecticide, herbicide producers.

Survey being made this fall admittedly may have little immediate value. But subsequent efforts, refinements and experience may develop reliable technique in 2-3 years.

USDA officials in the field are sending into Washington their OPINIONS of inventories in their areas. These will be evaluated and released to the industry for whatever value they may have.

A modest beginning is to be made by USDA, we understand, because of a lack of funds for a more vast and accurate undertaking.

Government-sponsored fertilizer & lime utilization program is to be advised by industry representatives. Six industry men, plus representatives of National Fertilizer Association and American Plant Food Council, have been invited to form an advisory group.

Program steering committee of USDA & Land Grant College representatives met in November to discuss jobs to be done and means to implement the program.

Industry cooperation has been assured. While gov't officials say the primary purpose of program is to get greater farm production . . . an effect of it will be to create greater demand for all types of plant food.

Decontrol of sulfur is taken here as an indication that severity of sulfur shortage is over. Officials warn that lifting of controls does not necessarily mean an end to all problems resulting from tight supplies. Spot difficulties are expected to continue until producer stocks are more evenly distributed.

The action stemmed from the improved supplies which in turn resulted from a drop in consumption during the first 2/3 of 1952. Domestic use and exports for 1952 are estimated at 6,090,000 long tons. Yearend stocks may increase by more than 400,000 tons.

Government aims to bring at least 75 per cent of U.S. farm land under conservation programs in 1953. This would be about 25 per cent more than 1951, the latest year for which figures are available.

The program is backed by $250,000,000 in subsidies. Almost half of this was paid to farmers who applied inorganic materials for conservation uses. In 1953, more than half of the conservation payment money probably will go to underwrite wider use of inorganics.

Almost 20 per cent of 1951 funds went to help pay the cost of applying phosphate materials . . . about 17 per cent for liming materials . . . 5 per cent for potash.

But the Agricultural Conservation Program will run into trouble in Congress next year . . . as in the past. Major farm organizations have been trying to end it, or at least cut the appropriations.

They apparently will try again . . . and perhaps find greater success. Congress so far has ignored farm organization pressures against the program, on grounds that ACP is an important cog in the drive to improve soils and increase farm output.

Banks and other lending institutions will be encouraged to make 3-5 year loans to farmers for production expenses . . . including fertilizer. Major segments of the industry, including the National Fertilizer Association, are much interested in this plan.

Easier credit for production expenses appears particularly necessary for farmers in periods of falling prices . . . such as is forecast for 1953. Research shows that additional fertilizer will increase yields at lower cost per unit crop.

Will soil conditioners ever go farming in a big way? Researchers think they will. Right now the best conditioners are considered too costly for broadcast farming. They are trying to develop new application techniques to make conditioners practical.

Government research for agriculture and its products very likely will get a shot in the arm from the new Congress. Major farm organizations plan to ask more funds for it . . . top Republican congressional farm leaders favor it.

More funds for USDA research on pesticides and fertilizers is one of the items high on the list to be asked.

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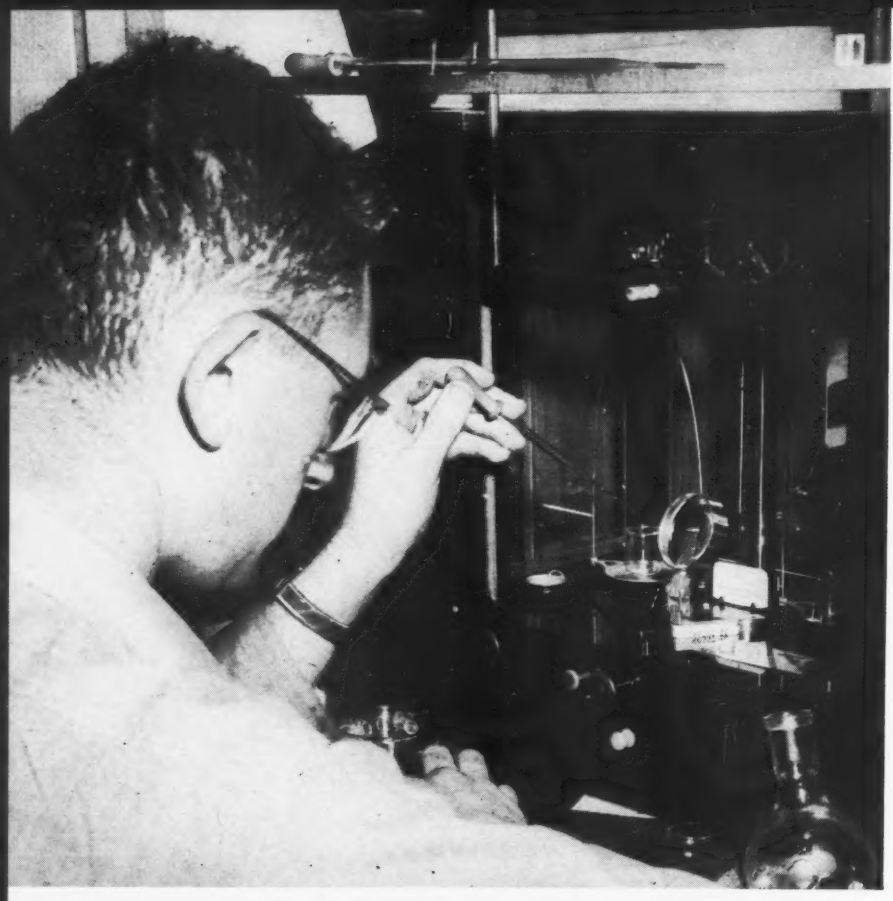


Allethrin samples are weighed out by chemist N. J. Green to test its effectiveness against houseflies.

A top USDA official reports department's 'baby' is doing fine

By David G. Hall

Division of Information
Bureau of Entomology and
Plant Quarantine, U.S.D.A.

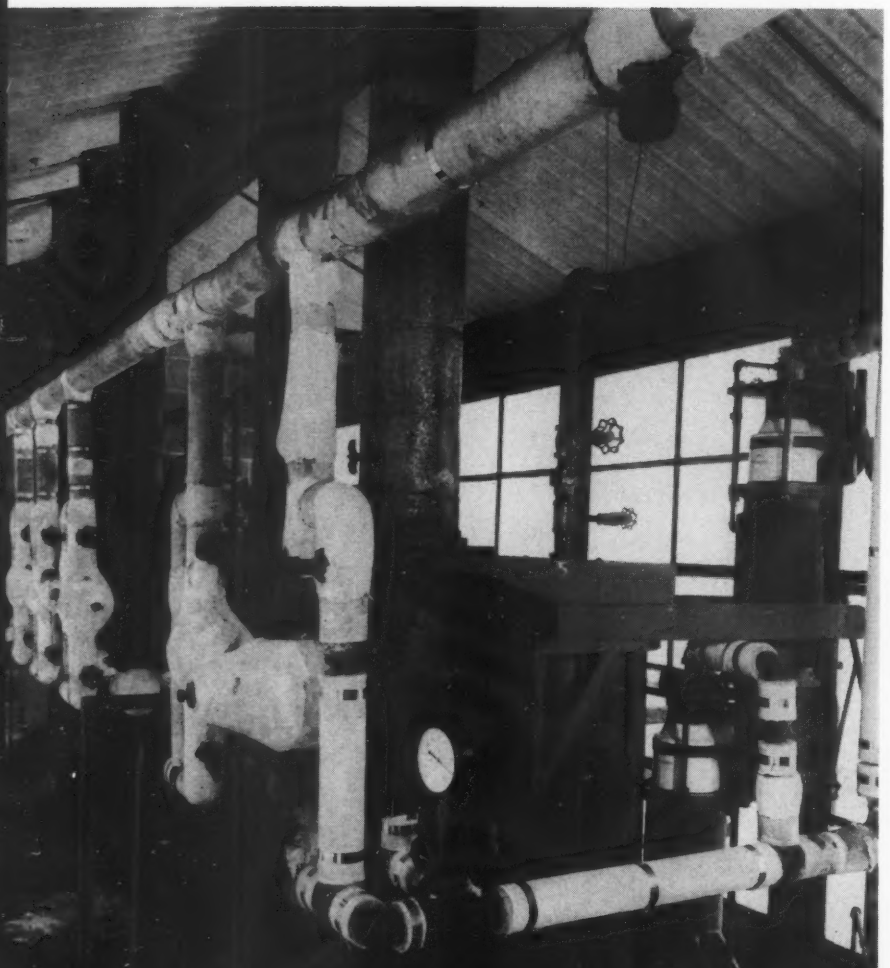
SO MANY new potent insecticides issue from the chemical laboratories these days that each promising one can claim only a moment's attention before joining its predecessors, competing with them as just another bug killer.

Thus did allethrin make its debut less than three years ago. Heralded by a U. S. Department of Agriculture announcement which appeared in hundreds of newspapers and farm and industrial magazines, allethrin had its big moment. Since then the public hasn't heard much more about it. But USDA chemists, who as the original synthesizers have taken a fatherly interest in its development, are proud to report that allethrin is doing all right for itself.

The synthesis of this pyrethrin-like insecticide was announced first in March, 1949, but it was more than a year later before the name "allethrin" was settled on by the government's Interdepartmental Committee on Pest Control. By that time—May, 1950—the first allethrin was commercially available.

Early In Field

Carbide and Carbon Chemicals Company and Benzol Products Company were early in the field in



Section of Benzol Products Co.'s allethrin production plant at Piscataway, N. J., showing steam jet ejectors used on vacuum service.

The story of

Allethrin

commercially producing this new insecticide. By November, 1951, each of these two estimated their output rate at about 25,000 pounds a year. Currently, U. S. Industrial Chemicals Company is putting the finishing touches on its new allethrin plant at Baltimore, Md. This has a planned capacity of 100,000 pounds a year.

Carbide and Carbon Chemicals is building a plant for the production of allethrin at Institute (near Charleston), W. Va., which when completed in 1954 will have a yearly capacity of approximately 400,000 pounds. Meanwhile, Benzol Products has increased the allethrin-producing capacity of its plant at Piscataway, N. J., upping its potential production to 100,000 pounds annually.

Military Need

Allethrin's rapid success as a commercial product results in part from a military need for a quick knockdown-type insecticide to help protect America's fighting men from such serious pests as the malaria-carrying mosquito.

Previously, pyrethrum-based insecticides had filled this need, but in recent years, pyrethrum—from daisy-like flowers—has not always been in plentiful supply. Today, the United States imports pyrethrum flowers from Kenya Colony and from the Belgian Congo in South Africa. Prior to 1941, the bulk of American imports of pyrethrum came from Japan. Only recently the first shipment of allethrin was exported to Japan by an American firm.

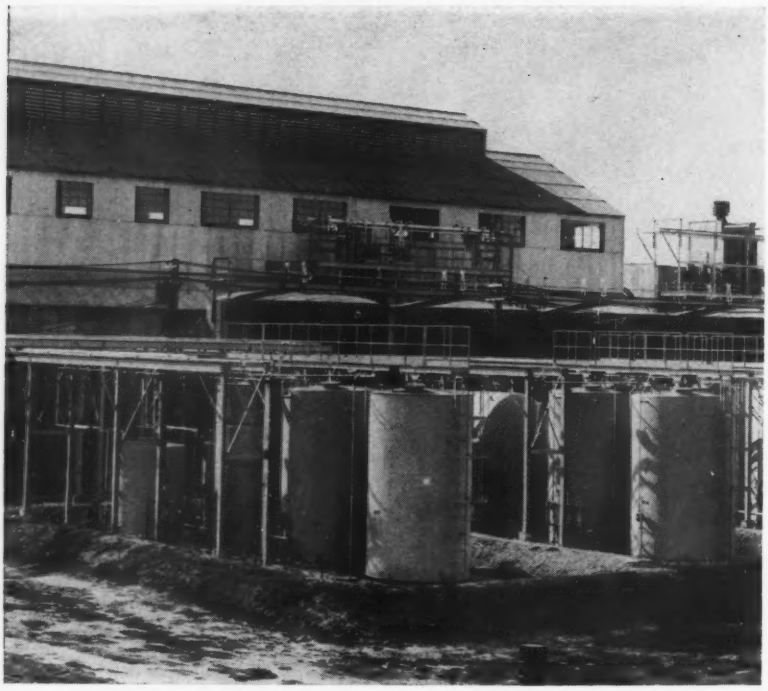
As production of allethrin in the U. S. increased—last year this country manufactured the allethrin equivalent of half of all pyrethrum imports—the price has decreased. Price of allethrin has been cut several times since it first went on the market in 1950. Originally priced the same as the pyrethrins from pyrethrum flowers, at $55 a pound, it now sells for $32 a pound. The chemists point out that even now it takes only about five cents worth of allethrin to supply a home-sized aerosol dispenser.

Nontoxic to Humans

Like pyrethrum-based insecticides, allethrin is relatively nontoxic to humans and other warm blooded animals, yet provides quick paralysis of such typically hazardous pests of man as the fly and mosquito. A whiff of 0.2 per cent allethrin will paralyze a mosquito in mid-flight, but rats, as representative of warm blooded animals, have been fed 0.2 per cent allethrin mixed with dog food for 41 weeks without harmful effects.

These are the qualities which have made allethrin especially valu-

Entomologist W. A. Gersdorff compares result of exposing houseflies to allethrin, left, with that of exposing them to natural pyrethrum. The synthetic material had the same knock-down effect as the natural.



General view of the U. S. Industrial Chemicals Co. plant at Baltimore, Md. Tank farm is in foreground. Company was one of first three producing allethrin, the synthetic pyrethrin.

able to the military agencies. Not only have they used it in fly and mosquito control, but more recently in Korea they have employed allethrin in the control of typhus-carrying body lice. Since allethrin was approved for use in aerosol-type dispensers in late 1950, the Armed Forces have bought a big share of more than 12 million of these allethrin "bombs" which have been produced commercially.

Although allethrin is generally available, undoubtedly more and more of it will reach the civilian market as military needs are filled. It should enjoy wide usage on farms, in homes and in business houses in America.

Use for Farm

On the farm, the homemaker will probably make the greatest use of allethrin, as a convenient and easy-to-use fly and mosquito killer. Economically, however, allethrin will play an increasingly important role in the control of flies in dairy barns, milking parlors and milk rooms on the dairy farm.

The trend toward devices which both beef and dairy cattle can use to treat themselves for fly control in pasture and feed lot bodes well for the future of allethrin on the farm. Automatic allethrin sprayers and other treating devices which cattle can, and will use frequently offer farmers an easy way to easily add to the milk and meat output of their animals.

The housewife, whether on the farm or in the city, will like allethrin as she begins to find it readily available on the market. The same features that make it useful to the military agencies—its quick effectiveness against such pests as flies and mosquitoes and its low toxicity to humans and pets —fits it ideally for use in the home.

Applying it from an aerosol dispenser simply by pushing a button, makes insect control for the housewife so easy that allethrin may, in the not-too-distant future, take its place on her shopping list along with the other regularly purchased items. Picnickers and others seeking recreation out-of-doors, will be able to control with allethrin sprays or aerosols many of the pests which generally annoy them.

Widespread Use

This synthetic insecticide has been shown to be effective against such various other pests as cattle lice, the body louse, chrysanthemum aphids, foxglove aphids and the tobacco moth.

The Bureau of Animal Industry of the U. S. Department of Agriculture has approved allethrin for use in insect control in meat packing plants, and more and more restaurant and cafe operators, and others who are in food handling businesses, are relying on this safe-to-use insecticide.

To date there has been no evidence of houseflies and mosquitoes becoming resistant to allethrin. Whether or not, as use of allethrin increases, the resistance problem will become associated with this insecticide neither chemists or entomologists know. USDA entomologists are currently carrying out research to determine this property of allethrin.

Highly Stable

Physically, allethrin is a highly stable insecticide which, when used like pyrethrum, is slightly superior in killing flies. The men responsible for synthesizing this clear-colored, mild-smelling, but potent insect killer are Milton S. Schetcher, Dr. Frederick B. LaForge, and Nathan Green, all U. S. Department of Agriculture chemists employed in the Division of Insecticide Investigations of the Bureau of Entomology and Plant Quarantine. W. A. Gersdorff, also of the Division, carried out the entomological evaluations coincident to the development of this insecticide.

Dr. LaForge, now retired from the Department, spent nearly 15 years determining the chemical structures of the four major insecticidal constituents of pyrethrum flowers. These he found in 1947 to be Cinerins I and II and Pyrethrins I and II. Cinerin I was chosen as the object of synthesis because of its simpler structure and greater stability.

Two years later the chemists synthesized the "homolog of Cinerin I" that we know today as allethrin. Six laboratory steps were required to develop allethrolone and six more to make chrysanthemum monocarboxylic acid. The final step, combining these two compounds, produced the toxic allethrin. Patents issued to the USDA inventors in 1951 and 1952 dedicate this insecticide to the free use of the people of the United States. ◆

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APRICOTS
Pandemis moth

BERRIES
Blackberries:
Red-necked cane borer
Boysenberries and dewberries:
Aphids
Red spider mite
Cranberries:
Lecanium scale crawler
Currants and gooseberries:
Aphids
Red spider mite
Raspberries:
Aphids
Red spider mite

CABBAGE, MUSTARD, TURNIP, KALE, RADISH AND CARROT
Vegetable weevil

CHERRY
Casebearer
Fruit fly
Leaf miner
Pandemis moth
Red spider mite
San Jose scale crawler
Shot-hole borer

CITRUS
Aphids

CORN
Budworm
Corn earworm
Leaf aphid
Fall armyworm
Sap beetle

CUCUMBER, SQUASH AND MELONS
Stink bug
Vine borer

GRAPES
Grape berry moth

LETTUCE
Aphids
Leafhopper

ORNAMENTALS (outdoors)
Bagworm
Cottony-cushion scale
Juniper webworm
Lace bug
Lecanium scale
Thrips

PEACH
Lecanium scale
Red-banded leaf roller
Shot-hole borer

PEAS
Pea weevil

PECAN
Black pecan aphid
Nut casebearer
Red spider mite
Twig girdler
Walnut defoliator
Webworm
Yellow aphid

PINEAPPLE (before planting)
Mealybug

PINEAPPLE (treatment of beds)
Mealybug
Cricket

POTATO
Armyworm

PRUNE AND PLUM
San Jose scale crawler

SOYBEAN
Velvetbean caterpillar

TOBACCO (seedbed)
Flea beetle
Midge larvae
Vegetable weevil

TOBACCO (field)
Flea beetle
Hornworm
Vegetable weevil

TOMATO
Armyworm

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Four members of symposium on ammoniation technology stand before microphone at Roney Plaza. From left, Ove F. Jensen, Du Pont; Edwin C. Kapusta, NFA, chairman; Joe C. Sharp, Spencer Chemical Co. and T. C. Rogers, Nitrogen Division.

Mrs. William Tyler, Red Star Fertilizer Co., left, and Mrs. S. L. Nevins, Mathieson Agricultural Chemical Co. keep an eye on J. C. Cabe, Farmers Fertilizer Co., in lobby of the Roney Plaza Hotel between convention sessions.

In Miami Beach . . . **. . . another record attendance**

Speakers Stress Education At NFA Fall Convention

By Hamilton C. Carson
Managing Editor

A RECORD BREAKING number of National Fertilizer Association members heard the importance of education stressed at the 26th annual fall convention of the group in Miami Beach Nov. 19–21.

More than 700 members of the organization and their families, met in the fabulous Roney Plaza Hotel to hear praise for the job the fertilizer industry is doing in providing plant food in increasing quantities for our expanded economy.

But they were cautioned that production will be largely ineffective if farmers are not educated to the advantages of chemical fertilizers.

And, according to the speakers, farmers aren't the only persons who can profit from information on the value of fertilizers. Bankers, who hold the key to purchase of fertilizers for many farmers, must be informed, one speaker declared.

In addition, the importance of fundamental research on soils, crops and fertilizers was discussed, as well as improved industry safety programs.

A symposium on ammoniation technology by four industry leaders completed the formal portion of the program for the three-day meeting.

Cocktail parties, fishing, bathing, bridge and fashion shows added interest to the convention and made it what many members termed one of the finest in recent years.

Talk on Loans to Farmers

Emphasis on the financial side of fertilizer use was given at the first day's meeting by Warren Garst, executive vice president of the Home State Bank, Jefferson, Ia., whose topic was "A Country Banker Looks at Fertilizer."

Garst, a long-time supporter of loans for farmers, declared that most bankers in the United States aren't aware of the important investments they can make in the future of farming by making loans available to farmers for the purchase of fertilizer.

"If you want the banker on your team let him learn the signals and the plays," he said. The extension service is doing a good job in showing the value of fertilizers but the NFA can't afford to sit back and relax.

"You must talk the farmer's language—get on the same wave length with him," he advised. Garst stressed the value of having salesmen and dealers meet with bankers as well as farmers to show the advisability of bank loans.

An important point to impress on bankers, Garst said, is that a community bank can succeed only so

long as it deals with people who succeed.

Several factors hinder the program of loans to farmers, the speaker said. On one hand, many bankers feel that loans to farm people already are far too heavy and on the other many farmers are categorically opposed to the idea of borrowing for any reason, no matter what the financial gain may be.

Farmers' Attitude toward Loans

The situation is further complicated by the fact that farmers expect a huge return on the loan. Garst said results of extensive interviews showed that 32 per cent of farmers questioned thought they should get a 10 per cent return and 39 per cent thought a 20 per cent return on the money invested was fair. "And some farmers won't borrow money under any circumstances," Garst added.

He outlined three factors which hold farmers back:

1. They are reluctant to change. (It took 18 years for hybrid corn to be used extensively and that was an easier job than the one which faces the fertilizer industry.)
2. Many lack managerial ability.
3. There is a widespread need for education on the values of fertilizer.

"You should develop good fertilizing habits in farmers while times are good so they won't stop during a depression," Garst urged. By a bigger use of fertilizer, aided by bank loans, "we can correct the situation in which 71 per cent of the farmers produce only 21 per cent of our products," he concluded.

"It's been a long time since anyone in the United States attended the funeral of a man who had starved to death," Willard M. Fifield declared in opening his talk before the convention.

Industry and Experiment Stations

Fifield, director of the agricultural experiment station at the University of Florida, spoke on the relationship between the fertilizer industry and the agricultural experiment stations.

He described the three main foes of mankind, throughout the course of history, as war, disease and starvation and said the latter largely had been defeated by farmers in this country.

"Two great developments have aided this situation," he said. "They are the fertilizer industry and the land grant college system."

He outlined the work of the Florida station and said that the work of the stations contributes to the economic wealth of the nation.

Mentioning what he described as "agricultural miracles" which have been wrought in experiment stations, he stressed particularly research with minor elements, carbamate fungicides and other chemicals.

"We are beginning to recognize that applied research in soil analysis and tissue analysis is important," he said. Fifield called for careful research by experiment stations and a closer liaison between research and industry.

More Research Needed

Another call for research was sounded by Dr. A. H. Moseman, Chief of the Bureau of Plant Industry, Soils and Agricultural Engineering.

"We share many problems in our effort to improve processes and products, to develop higher analysis fertilizers, to devise better methods of application and to increase the efficiency of crop use of nutrients," he told the group.

He said technology in agriculture has come a long way in the past 10 years but that the important thing is to apply the recommendations already made.

"Expanded use of fertilizers will help and is important," according to Fifield. "The Department of Agriculture recently has joined with the Land-Grant Colleges in setting up a comprehensive program to encourage more efficient use of fertilizer and lime. This will be a vital factor in helping farmers meet food demands in the future. Used effectively fertilizer and lime will produce high crop yields, build up the soil and pay the farmer an adequate return on his investment."

Fifield went on to describe fundamental research in the fields of tobacco growing, phosphorus deficiencies, nutrient deficiencies, irrigation, seed quality, soil fertility and structure, herbicides and fertilizer technology.

Contribution of Radioisotopes

In studying the inter-relationships between crops and fertilizers, soils and water, he stressed the important contribution of radioisotopes in carrying out experiments.

The timely subject of chemical soil conditioners also was aired by the speaker, who said "in some of the new soil conditioners we have—for the first time—an effective tool for studying soil structure. . . . The possible long-range agricultural benefits from the new compounds are intriguing."

Answers to agricultural problems don't come easily, Fifield said. "You know how to make high-analysis fertilizers but there still is need for satisfactory methods of granulation."

He said research would help answer many of the problems and called on industry members to assume part of the load.

The importance of safety to the fertilizer industry was brought home by W. N. Watmough Jr., vice president of Davison Chemical Corp. He said that not only can fertilizer companies afford to set up safety programs in their plants, they can't afford not to.

Watmough, one of the leaders in the farm chemicals safety movement, described the establishment of the fertilizer section of the National Safety Council two years ago.

He presented figures which prove the value of a safety program in terms of dollars and cents in addition to the humanitarian value of such programs.

Insurance premiums drop, workers are happier and work is done more efficiently in a plant with a good safety program, he said.

Allstetter Views Future

In a short address opening the convention W. R. Allstetter, NFA vice president, gave the "Fertilizer Outlook" for the future. He mentioned NFA activities, particularly its program to interest bankers in

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From left: Mr. and Mrs. A. W. Noland and Mr. and Mrs. W. Gedge Gayle, Kelly-Weber & Co., and Mrs. T. E. Camp, Jr., Southwest Potash Corp.

Mrs. G. W. Moyers, International Min. & Chem. talks with Mrs. W. F. Williamson and Mrs. W. F. Williamson Jr., Louisiana Agri. Supply Co.

W. J. Chapin, Swift & Co., left, meets with M. Ward Cole, Jos. C. Jett Co., center, and W. W. Johnson, Smith-Rowland Co. in the Roney Plaza.

loans to farmers and supervised showing of the new association film "Cash in On Corn" which got an enthusiastic response from the delegates.

Participating in the ammoniation technology symposium were T. C. Rogers, of the Nitrogen Division, Allied Chemical & Dye Corp.; Joe C. Sharp, of Spencer Chemical Co.; Ove F. Jensen, of DuPont and W. E. Schaffnit, of Stedman Foundry and Machine Co.

Talking on ammoniation of normal superphosphate, Rogers gave a brief outline of the history of ammoniation, starting in the early twenties with aqua ammonia and in 1929 with synthetic anhydrous ammonia. He said there is much room for improvement in ammoniation and that because some plants find it easy to ammoniate at low rates they are slow to change to high rates which necessitate plant alterations.

Rogers stressed the importance of uniformity of

Photos on Opposite Page

1. NFA staff members discuss the convention. From left, Malcolm H. McVickar, agronomist, Mrs. Mary Wallace Nelson, secretary to president Russell Coleman and William S. Ritnour, assistant secretary-treasurer of the group.

2. Mr. and Mrs. William H. Morris, Chemical Packaging Corp. going to annual NFA dinner.

3. E. A. Geoghegan, left, program chairman, introduces W. M. Fifield to Warren Gerst.

4. Sam S. Emison, left, Consolidated Chemical Industries and Kirk Sanders, Spencer Chemical.

5. Warren Garst, executive vice president, Home State Bank, Jefferson, Ia., addresses convention.

6. Harrold Trammell, left, and J. C. Cabe, both of Farmers Fertilizer Co. meet between sessions.

7. W. W. Coffin, left, Link Belt Co., meets at the NFA registration desk with A. V. Slack, TVA.

8. Potash is the subject as John W. Hall, left, Potash Co. of America, talks with H. B. Mann, American Potash Institute at the convention.

9. Mrs. A. W. Noland, left, visits with Mr. and Mrs. W. Gedge Gayle, all of Kelly-Weber & Co.

M. S. Malone, left, and Gaines L. Boynton, right, International Min. & Chem., talk with John L. Cope, Reliance Fertilizer Co. during convention.

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T. W. Allen, President of Sand Mountain Fertilizer Company, of Attalla, Alabama, says:

"Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store."

☆ ☆ ☆

E. T. Spidle, General Manager of the Capital Fertilizer Company, Montgomery, Alabama, says:

"These bags proved to be very satisfactory and we expect to use them again next season."

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Mr. Dallas Greer, who uses Mountain Brand Fertilizer on his farm, poses with his wife and daughter . . . all three are wearing garments made from Bemis H-C print patterns. Pleased customers like the Greers help get still more customers for Mountain Brand.

The experience reported by Mr. T. W. Allen, president of the Sand Mountain Fertilizer Company, of Attalla, Alabama, is typical. He gave a trial-size order for Bemis H-C Dress Print Bags for the well-known Mountain Brand Fertilizer. Sales results were so good that *within three weeks he placed three more orders . . . all very large ones.*

Now, Mr. Allen says, "Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store. And those New York-designed Bemis prints certainly please the women."

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A. H. Moseman, USDA, left, and W. N. Watmough Jr., Davison Chem. Corp., right, look over program with E. A. Geoghegan, program chairman.

Edward W. Harvey, Nitrogen Division, left, talks with Mr. and Mrs. E. S. Russell, Old Deerfield Fertilizer Co. before annual NFA buffet dinner.

Harold B. Bryant, and Shelby W. Brown, Bemis, left, get together with M. D. Broadfield, Ark. Farmers Plant Food and C. L. McDaniel, Lion Oil.

ammoniation and said that uniform spraying of the phosphate is helpful.

Because temperature increases by 1.7 degrees F. for each pound of ammonia used, Rogers said, care must be taken to control the heat of the mixture. He said the superphosphate itself is the biggest variable in the ammoniation process but stated that if a uniform superphosphate is used with good ammoniation technique many of the problems will be eliminated.

New Ammoniating Process

A new process for saving sulfuric acid and producing plant food at a lower cost was mentioned by Sharp, who spoke on ammoniation of triple super.

"This process would involve the use of 83 per cent ammonium nitrate solution to replace ammonium sulfate," he said. "This substitution would make it possible to produce 15–15–15. Comparative raw material costs based on 13–13–13 indicate a saving of $4.60 to $10.22 a ton."

Equipment designed to handle a slurry would be necessary and granulation would be required, according to Sharp. Cost of the plant was set at a fraction of the cost of a nitro-phosphate plant of equal capacity.

Sharp also contrasted triple super with normal as to ease of ammoniation, temperature and chemical structure. He pointed out that triple super does not absorb ammonia as readily as normal and that in extremely cold weather ammonia refuses to combine with triple super within a reasonable mixing time.

"By adding some ordinary superphosphate the reaction can be made to take place rapidly. Once the mixer has become hot the addition of normal super can be discontinued," he stated.

Sharp used slides to show the cost of raw materials when various ammoniating liquids are employed.

Jensen, in discussing ammonia solutions, traced the history of urea ammonia solutions in the thirties for ammoniation. He said 24 pounds for 1,000 pounds of super is the minimum for ammoniation and 42 the maximum. He talked briefly about air pressure, storage, shipping, containers and corrosion involved with ammoniated super and listed four operating suggestions:

1. Have tanks installed with adequate safety devices.
2. Use gauges to insure safety.
3. Paint lines and valves for identification.
4. Instruct personnel in the safe operation of all equipment.

Ammoniation Equipment Described

In the final portion of the symposium, which was led by Edwin C. Kapusta, of the NFA staff, Shaffnit discussed various types of ammoniation equipment. He stressed the need for accurate weights, efficient mixing, careful timing and safety precautions to be observed in using the equipment. Mixer types and location of sprayers also were considered by Schaffnit.

One of the highlights of the convention was the

(*Continued on page 72*)

Manufacturers must make certain they know the law when it comes to

Labeling Pesticides

By M. F. Crass
Secretary
Manufacturing Chemists Association
Association of Economic Poisons Control Officials, Inc., Oct. 4, 1952

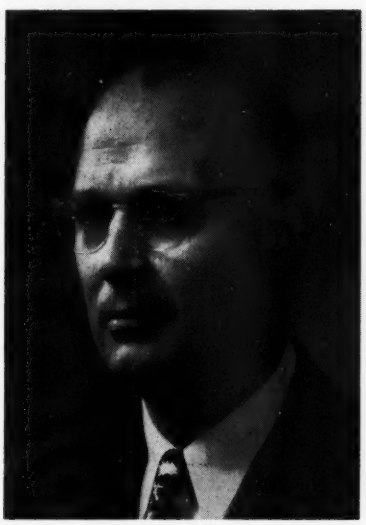
THE incentive for a program of adequate labeling probably dates back to the introduction in Congress of the so-called Bingham bill in 1932. Prior to that time there were officially in existence only the Federal Caustic Poison Act and the regulations of the Interstate Commerce Commission, both concerned with labeling within well-defined but narrow limits, plus a smattering of limited state requirements.

The Bingham bill was prepared in response to the activities of the late Dr. Yandell Henderson of the Yale University Medical School and Dr. Alice Hamilton—at that time the head of the New York State Department of Labor. The bill was introduced by Senator Bingham (R-Conn.).

It called for the labeling of certain chemical products, particularly those evolving potentially injurious vapors, requiring as a warning the word "poison" and the well-known skull and crossbones. The bill did not require specific warnings as to the nature of the hazards involved or protective measures for overcoming such hazards.

Aroused Industry

The bill's introduction, however, aroused the chemical industry to the necessity of initiating prompt measures for the guidance and implementation of a program of adequate labeling, and a committee



M. F. Crass

was organized to meet with a group representing the proponents of the bill, in the office of Dr. Homer C. Cumming, Surgeon-General of the U. S. Public Health Service, in Washington.

At the conference it was agreed that voluntary methods were preferable to a federal act, and a permanent committee, subsequently called the Chemical Products Agreements committee, was formed to work out with the surgeon-general a series of agreements between manufacturers of six chemical product groups and the surgeon-general. Dr. J. G. Townsend, at that time director of the Division of Industrial Hygiene, headed the committee until his retirement two years ago.

Manufacturers voluntarily agreed to affix specific warning labels on shipments of those products and to certify such action on bills of lading and invoices.

Texts of the several labels were prepared by the committee and the surgeon-general's office. They applied to methanol, carbon tetrachloride and related volatile chlorinated hydrocarbons, the chlorinated naphthalenes, diphenyls and diphenyl oxides; carbon disulfide, aniline oil and benzene.

MCA undertook to print the labels and to supply them to all users at cost. These agreements were entered into early in 1934 and were lived up to faithfully by all manufacturers who were parties to the agreements until their discontinuance in the summer of 1952. Discontinuance came as the result of the large number of new products on the market not covered by the agreements and the existence of the MCA labeling principles which were considered to be better adapted for present conditions. The U. S. P. H. S. recently has taken steps to reactivate the committee, however, in order to provide a continual evaluation of current needs.

Labeling Committee

Most of you are familiar with the history of MCA's Labels and Precautionary Information Committee, which was formed in 1944 and promptly dubbed the "LAPI" Committee. By that time, the association had drafted, and persuaded a large number of manufacturers to use, many additional product warning labels over and above those covered by the surgeon-general's agreements.

In addition, MCA had prepared and distributed to its member executives a pamphlet entitled "A Confidential Report on Adequate

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Labeling—Its Importance to the Chemical Manufacturer." Part I of this report dealt with the question of adequate labeling and Part II was entitled "The Manufacturer's Duty as Interpreted by the Courts."

On the whole, however, the labeling of hazardous materials was sketchy and unpopular. The few regulatory requirements in the field suffered from lack of uniformity and took no recognition of relative degrees of hazard. While certain chemicals were being pointed to as "villains," many other more hazardous materials were being happily distributed with no recognition of their dangerous properties.

Meanwhile, the organic insecticides and other new and useful products possessing hazardous characteristics were being synthesized by the chemical industry and markets were being developed.

Manual Published

By the end of 1945, the committee had evaluated the several degrees of hazard, established basic principles applicable to a wide variety of chemical products and published Manual L-1, "Warning Labels."

The LAPI Committee sought from the start to establish a program of labeling which would provide uniformity in terminology and indicate the relative hazards of all chemicals. In many cases data for even the common chemicals were sadly lacking and, as a result, some of the early illustrative labels were later found to be either too strong or too weak.

The Association's program served to focus attention on this lack of data and much has been done to fill in the gaps and develop more authentic information. No doubt additional facts will make further revisions necessary but we shall continue to look forward to a "permanent edition" some day.

Although it has been necessary to change many illustrative labels in Parts II and III, it has been gratifying to note that the Principles in Part I have required only minor changes, largely to improve their clarity. We believe that the soundness of these principles has been well proven.

The MCA Manual is directed primarily to the labeling of industrial packages but in Part I a section has been devoted to small package labeling. Because of the growing demand for guidance in this field there seems to be a real need for a separate manual, patterned after the MCA publication and possibly containing a Part I—Principles of Small Package Labeling, and Part II—Illustrative Labels for Small Packages.

MCA believes that such a manual should be prepared. I understand that the Chemical Specialties Manufacturers Association is organizing a committee to consider the drafting of such a publication.

The committee is expected to include MCA Committee members who are also CSMA members and who can contribute their experience to this much-needed extension of the basic MCA program.

Sample Labels

Part III of the Manual gives illustrative labels for certain pesticide chemicals. In deciding to add Part III to the Manual, the following points were considered:

First and foremost, pesticides are chemicals and many of them are classified as hazardous. Because pesticides are probably the most regulated group of chemicals, uniformity in precautionary labeling requirements is greatly to be desired.

Because the conditions of use of pesticides generally vary from those encountered in the use of industrial chemicals, it seemed desirable to illustrate the application of MCA principles to pesticide labeling.

Every effort was made to work closely with the Federal Insecticide Division and other officials to develop satisfactory labels which would be consistent with Interpretation 18, which was published in the Federal Register shortly after the second edition of our manual appeared. The typographical limitations of the Federal Register are such, however, that an optimum display of labeling is not feasible and there results a pattern of compactness which unfortunately may cause a lack of attention being given to this information by registrants unfamiliar with the general clarity of LAPI layout.

We are quite sure that the Insecticide Division agrees with MCA that appropriate signal words—"Danger!", "Warning!", "Caution!"—used with statements of significant hazards are desirable and should be encouraged by industry.

Signal Words

Because signal words cannot yet be chosen with complete accuracy, however, the officials do not have the legal backing to require as many "Warnings" or "Dangers" as our committee would recommend. Suggestions along this line to registrants, however, are followed in most cases.

Our committee does not and cannot represent itself as able to provide specific precautionary labeling for all chemicals of hazardous nature. Part I, however, is applicable to all such products. The permutations and combinations possible in pesticide products are infinite.

Therefore we endeavored to select a representative group of products to show the application of our principles to pesticide labeling and hoped that those responsible for labeling would then work out their own labels for specific products. However, in response to numerous requests for an expanded Part III, we are planning to add a number of new labels in the forthcoming revision. The rapid development of new pesticide chemicals makes it difficult to keep abreast of current developments unless frequent manual revisions can be made, or some provision set up for additions and changes between revisions.

Welcomes Advice

MCA realizes it has a responsibility in maintaining a useful and accurate manual, and is constantly considering better ways and means of achieving this end. The association invites suggestions for making the manual a more useful publication and requests continued cooperation in preparing the necessary labels.

Obviously we are quite proud of our program. We are convinced it has stood the test of time, adaptability and much official scrutiny. Its rapid and favorable acceptance by the chemical industry and many regulatory agencies is most gratifying. ◆

Trend to Fertilizers containing no sulfur focuses attention on

Fertilizer with sulfur is conducive to growing white clover, as dark patches show. Clover was failure on plots lacking it.

Sulfur Nutrition of Plants

By J. R. Neller
Soils Chemist
Florida Agricultural Experiment Station

WHEN Lawes invented the process of making superphosphate in 1842 he provided for an important source of sulfur as well as phosphorus, in that ordinary superphosphate contains about as much sulfur as phosphorus.

Previously the sulfur needs of crops had been met by adding to the soil hydrated calcium sulfate, also known as gypsum or land plaster. The use of gypsum became widespread for treatment of arable lands in many countries because crop response to it often was phenomenal. It had become known that sulfur, as well as calcium, was among the plant nutrients necessary for growth and it was known also that gypsum supplied both elements.

When superphosphate became available it seemed to make gypsum applications unnecessary and rightly so, because ordinary superphosphate is about one half calcium sulfate by weight. In the presence of soil moisture this calcium sulfate readily takes up water and becomes the hydrated compound known as gypsum. Many fertilizer mixtures also contain the sulfates of potassium and nitrogen where again the sulfur carried by the potassium and nitrogen may be ample for the needs of any crop.

Sulfur Deficient Mixtures

In more recent times two trends have taken place. One is the increasing dependence upon chemical fertilizers for crop production, particularly at high levels. The other is introduction of fertilizer compounds which do not contain sulfur. Ammonia and ammonium nitrate are taking the place of ammonium sulfate and muriate of potash often is used instead of the sulfate salt. Phosphates which are processed by heating, or by acids other than sulfuric acid, are coming into more general use. Thus a so-called complete fertilizer can be formulated to contain N, P and K and be almost completely devoid of sulfur.

These gradual changes in composition of fertilizer mixtures have crept unawares upon many agriculturists so that they may be operating a soil management program, with sulfur deficient, without realizing this limitation in crop production. A particularly important example is that sulfur is largely eliminated when the phosphorus source in a fertilizer mixture is changed from ordinary superphosphate to the more concentrated triple superphosphate.

For these reasons, therefore, it is becoming more and more necessary that sulfur reserves of a soil be known as well as the balance of sulfur additions against losses of sulfur by cropping, oxidation of organic matter and leaching.

Widespread Situation

Experimentation has shown that there are two general areas in the United States where the native supplies of sulfur in the soil fall far short of crop requirements. These are the arid and semi-arid

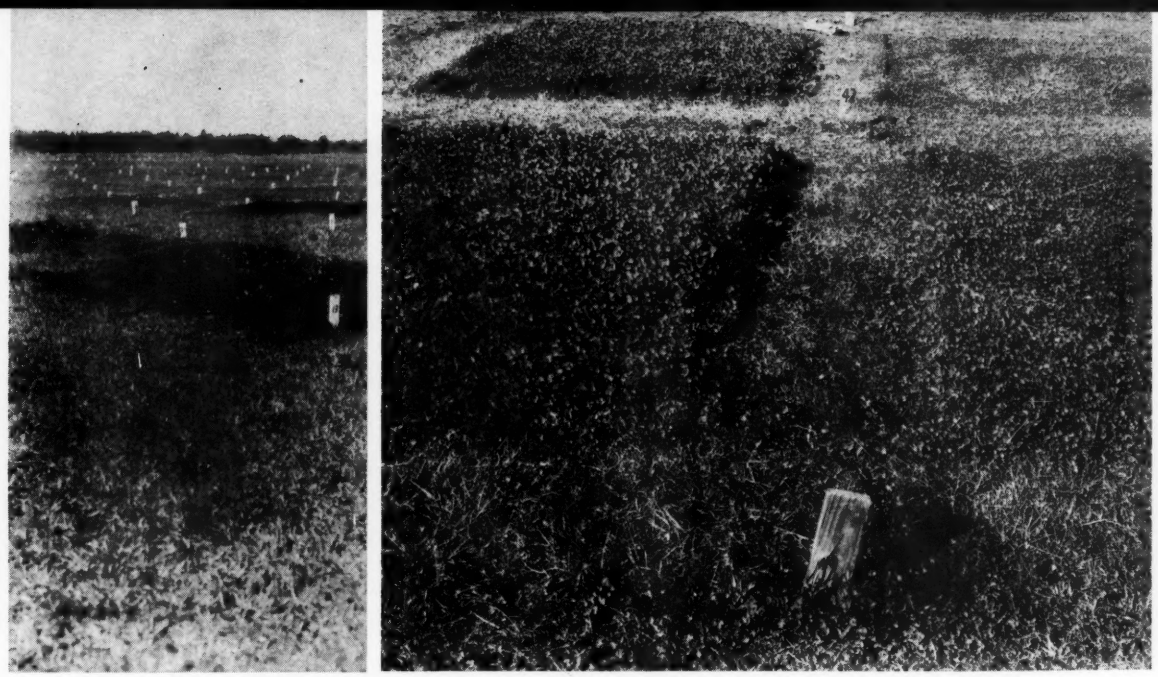

Photo at left is another view of effect of sulfur on clover growth. At right, clover was a failure in absence of gypsum (upper right plot) and was stunted (lower right) where superphosphate was omitted for a year, gypsum being leached out. Lower left got gypsum and sulfur-free phosphate; upper left—super.

soils of the West and Northwest, and the humid soils of the Southeast. In the humid areas sulfate sulfur leaches readily from the soil thereby causing a sulfur shortage, while the sulfur deficient soils of the arid regions are for the most part of volcanic origin where any former supplies of sulfur have been lost by volatilization.

Other experiments indicate that soils of some semi-humid areas as in the Central, Northern and Eastern parts of the United States would become deficient in sulfur if sufficient sulfur were not supplied from some outside source such as a sulfur bearing commercial fertilizer, sulfur enriched manures and rain water heavily laden with sulfur which falls in or near industrial areas where considerable sulfur is released to the atmosphere.

Florida Soils

Some of the more recent experimentation on the sulfur nutrition of plants has been done in Florida and is reviewed briefly here. Particular attention has been given to the fertilizer program for pastures, because it is on some of these that a considerable tonnage of sulfur-free phosphates such as finely ground rock phosphate and colloidal or waste pond phosphate have been and are being used. Phosphatic basic slag also serves as a source of phosphorus and it is almost devoid of sulfur.

For some time it has been known that legumes grown on the lighter sandy soils of Florida are likely to be stunted unless the fertilizer mixture contains a source of sulfur. Field plot trials set up in central and northern peninsular Florida now have revealed that a pasture legume planting such as White Dutch clover may be a complete failure if sulfur is lacking in the fertilizer, whereas the same fertilizer program plus elemental sulfur or an equivalent amount of sulfur in gypsum results in good growth.

Sulfur Response

This response to sulfur is seen in photograph No. 1 taken in January, of a series of plots on a fine sandy soil typical of the flatwoods of peninsular Florida. The plots were planted to white clover and Bahia grass after receiving a uniform treatment of lime, muriate of potash and minor elements. The phosphorus was supplied from different carriers.

The photograph shows that clover was growing well on those plots where a source of sulfur was present in the phosphate or added with it as either flowers of sulfur or as gypsum. Clover either failed to establish itself or was so stunted as to be worthless on those plots which did not receive a source of sulfur. Some of these plots are shown in photograph No. 2. The amount of sulfur used was equivalent to that of the calcium sulfate carried by the 20 per cent superphosphate in the standard treatment which was a 0–14–10 mixture at 500 pounds per acre.

The sulfur-free carriers of phosphorus were rock phosphate at 2000 pounds per acre and calcined or heat treated phosphate in amounts of P_2O_5 equivalent to that in the superphosphate treatments. Both of the sulfur free carriers were good sources of phosphorus in this acid sandy soil which had a *p*H of about 5.6 one year after broadcasting finely ground calcium limestone at two tons per acre. The necessary source of sulfur was served equally well by either flowers of sulfur or by gypsum containing an equivalent amount of sulfur.

Photograph No. 3 shows a similar series of plots on a similar type of soil at the Range Cattle Station in central peninsular Florida. Here again it may be seen that clover is in evidence only on those plots the fertilizer for which contained a source of sulfur.

In the western part of Florida on heavier, finer textured soils, there appears to be a response to sulfur but to a lesser degree than for the more sandy soils of the peninsula part of the state.

Experimental work involving sulfur as a nutrient is being continued in both areas. ◆

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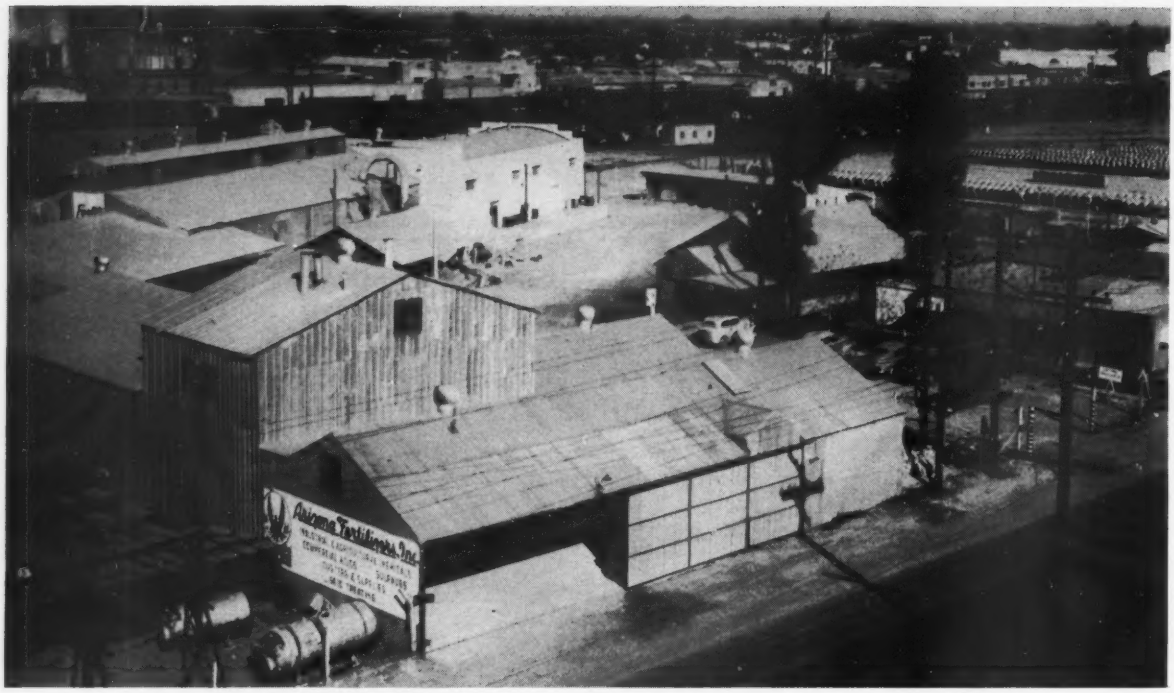


General view of the Phoenix plant of Arizona Fertilizers, Inc., one of the leaders in the West.

He went to Phoenix for his health . . .

But Frank Feffer remained there to make fertilizers, pesticides

By Hamilton C. Carson
Managing Editor

WHEN Arizona Fertilizers Inc. celebrated its 20th anniversary two years ago, the occasion attracted attention throughout the Southwest and in many other parts of the country.

It seems rather astounding on first consideration that a company which started out with an insignificant plant and only a few workers should gain national prominence in just 20 years. But Arizona Fertilizers is in the farm chemicals industry, and no stories of growth and expansion in that industry, which itself has snow-balled tremendously from modest beginnings, can cause much surprise.

From Insurance to Fertilizer

Frank M. Feffer Sr., president of the company, likes to tell the story of his father's entrance into the fertilizer business. The elder Feffer, J. A., went to Phoenix, Ariz., in 1929 for his health. Although he had been an insurance salesman for years, he also had a long interest in agriculture.

Thus it was with a sympathetic ear that he listened to a fellow lodger in a Phoenix boarding house tell about a struggling young fertilizer company called Arizona Natural Products Co. Feffer decided to buy a half interest and became a partner in the enterprize.

His purchase wasn't big. In those days the company was housed in an ancient building with a rusty ore mill as the only piece of machinery. One man did all the mixing and delivering of fertilizer.

Despite the tottering condition of the business and the lack of efficient equipment Feffer soon became sole owner of the company and made it pay—even in the depths of the depression.

Third article in FARM CHEMICALS *new series on fertilizer and pesticide manufacturers.*

Sons Join Organization

At that time—in 1935—Feffer persuaded his son Frank, who, like his father, had started out in the insurance business, to join him in the fast growing organization. Frank's brother Ralph joined the company the same year and the boom was on in earnest.

The men added modern equipment, initiated efficient operating procedures and began to mix fertilizers in a big way.

One of the most important additions to the company was the hiring of M. F. Wharton, a horticultural expert of long standing in the area, in 1937. Wharton had served with the state extension service for many years and was familiar with the fertilizer needs of farmers in the southwest.

Wharton set up a laboratory, hired a chemist and started a testing program designed to improve the quality of fertilizers produced by the company, which by this time had changed its name to the present title.

But Wharton's contribution to Arizona Fertilizers Inc. was more than just setting up a lab. He urged his fellow members of the firm to get into the insecticide business because, he argued, the fields were intimately linked.

Insecticide Plant Added

In 1940 an insecticide blending plant was opened, with a capacity of 1,000 tons a year. Present capacity of the Phoenix insecticide mixing plant is virtually unlimited, according to Feffer. It is equipped to mix and deliver 300,000 pounds a day.

On the fertilizer side, the increased capacity has been just as amazing. In 1930 annual capacity was 2,000 tons. Today it is 50,000 tons.

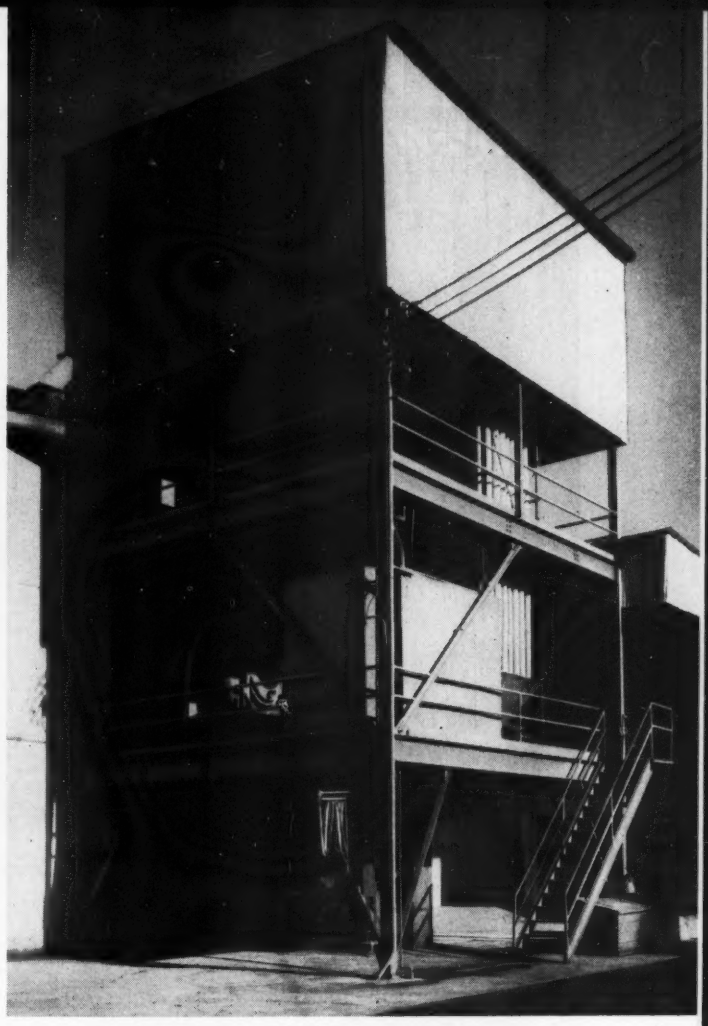
The company suffered from cramped quarters in the early days of its business but that was nothing compared to the space problem which existed during World War II with expanded activities curtailed by wartime materials shortages.

But after the war, physical expansion was spurred to catch up with the needs of the many fields the company had entered. These include, among others, the acid delinting of cottonseed, started in the late thirties. Ralph Feffer, who had an early interest in this part of the business is in charge of the operation.

New Mixing Plant

Last spring the company built an insecticide mixing plant in Toltec, Ariz., with a daily capacity of 200,000 pounds of dust. Dusts are mixed on order and delivered within 24 hours, assuring growers a fresh, free-flowing product.

The insecticide plant of the company, incidentally,



New fertilizer mixing unit at Arizona Fertilizers, Inc., with a capacity of 20 tons per hour.

Mike Sullivan, lab chemist, takes soil samples in modern Arizona Fertilizers laboratory

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Four of Arizona Fertilizer's field men are shown with their trucks. All are graduates of agricultural colleges.

is the largest west of the Mississippi River. The main company plant is located on a 2½ acre plot, with storage warehouses and separate mixing mills included in the setup.

Expansion of the company has by no means come to a stand still. Feffer states that the organization soon will complete construction of a modern plant for manipulation of basic insecticide materials in connection with the Toltec plant.

In addition an ammoniating unit is being added to the Phoenix fertilizer plant.

Feffer is quite proud of the company laboratory, and rightly so.

"We have been told it is unusually well equipped," he stated, adding that it is staffed by two full time chemists.

Doing research work in the laboratory under Wharton are Michael F. Sullivan, chief chemist; Louis Connors, assistant chemist and Marvin H. Frost Jr., entomologist.

Modern Equipment in Lab

Up-to-date equipment is used in the lab to test soil samples and quality of fertilizers and insecticides. This includes a flame photometer—one of the few used commercially in the country. The instrument gives an analytical check of test substances by refraction of light.

Modern equipment also is the feature of the insecticide blending plant in Phoenix.

One insecticide blending mill stands 27 feet high and consumes 3,000 pounds of raw materials in three bites.

The mill, a Sprout-Waldrom product installed in 1947, is modern in every respect. At the time of its installation there was only one other west of the Mississippi.

The mill handles 1,000 pound charges and can accommodate three at a time, each in different stages of mixing.

The charge is dumped into a floor level hopper, then brushed through a screen. After being lifted into the top of the mill it is mixed thoroughly in a ribbon type blender.

From the blender it goes to the attrition blender, main part of the mill.

When he talks about the pesticide department of Arizona Fertilizers, Wharton's philosophy is that "You can't take modern insecticides for granted."

The company doesn't. It has spent more than $100,000 in recent years expanding its insecticide processing and storage facilities.

As Feffer puts it "We refuse ever to sacrifice quality for mere quantity production.

"When it becomes apparent that farmers are going to need more insecticides than ever before we build a plant to meet the demand and at the same time maintain our quality standards."

Handling sales for the company are 11 field representatives, all graduates of accredited agricultural colleges. Their technical background helps them advise farmers throughout the state on fertilizer and pesticide problems.

It is significant that Arizona celebrated its 20th anniversary on the 100th anniversary of the manufacture of mixed fertilizers in the United States.

Today the multi-million dollar company produces thousands of tons of fertilizers and pesticides in modern plants, using modern methods, to help farmers in the Southwest produce an ever-increasing amount of crops. ◆

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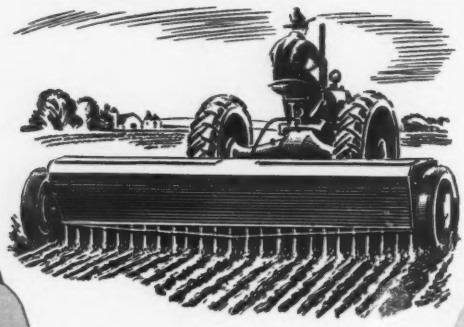

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From lab to market there's lots of work to be done . . .

How Pesticides are Developed

H. L. Haller

Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U.S. Department of Agriculture

Association of Economic Poisons Control Officials, Inc., Oct. 4, 1952

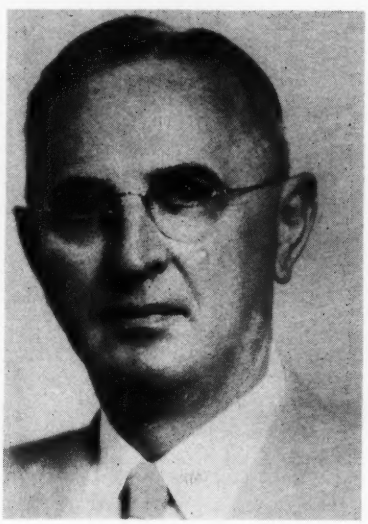
AMONG the more important problems in the development of new insecticides are methods of analysis. It is highly desirable to have accurate and specific methods of analyses for each pesticide. Most of the newer products are relatively complex synthetic organic compounds. They differ from the inorganic insecticides, such as the arsenicals and fluorine products, in that their effectiveness is dependent upon the composition or structure of the molecule as a whole rather than upon a specific element such as arsenic, lead or fluorine.

For convenience, the newer insecticidal chemicals may be divided into four general groups: 1. chlorinated hydrocarbons, 2. organophosphorus compounds, 3. synthetic pyrethrin-like esters and 4. synergists.

For their analysis, it is not sufficient to determine one element, for example, the organically bound chlorine in the chlorinated hydrocarbons or the phosphorus content of the organo-phosphorus insecticides and calculate back to the original chemical.

Wrong Results

Inert contaminants and degradation products containing these elements would interfere and lead to erroneous results. Numerous studies have been reported of efforts to find specific methods of analysis for members of each of the classes listed above.



H. L. Haller

For the greater part the studies have concerned themselves with procedures useful only for the insecticidal chemical and not for the formulated or finished insecticides.

Accurate Methods

Although accurate methods for determination of the insecticidal chemical are necessary and useful, methods also are needed which will permit detection and accurate estimation of the chemicals in various formulations—dusts, wettable powders, emulsifiable concentrates and aerosols. Methods also are needed for determining the products in combination with other insecticides and fungicides and in spray residues.

That the problem also is one of considerable importance to the ethical manufacturer, producer or formulator of insecticides may not be generally recognized. Many of the state regulatory agencies publish analyses of insecticidal compositions purchased in the open market. If the method used gives erroneous results, especially values which indicate a lower content than claimed on the label, the manufacturer is subject not only to a fine, but future sales of his product may suffer.

Industry Cooperation

In an effort to aid in the solution of some of these problems our Bureau of Entomology and Plant Quarantine several years ago initiated collaborative studies between government and industry. The first such study concerned itself with benzene hexachloride. This was shortly followed by hexaethyl tetraphosphate and tetraethyl pyrophosphate.

Since last spring, government and industry workers have collaborated in a thorough study of methods for the gamma isomer content of benzene hexachloride in insecticidal formulations. The AOAC method is being intensively studied and already much progress has been made in the solution of this difficult problem.

Cooperative government-industry studies also are underway on allethrin, the recently discovered

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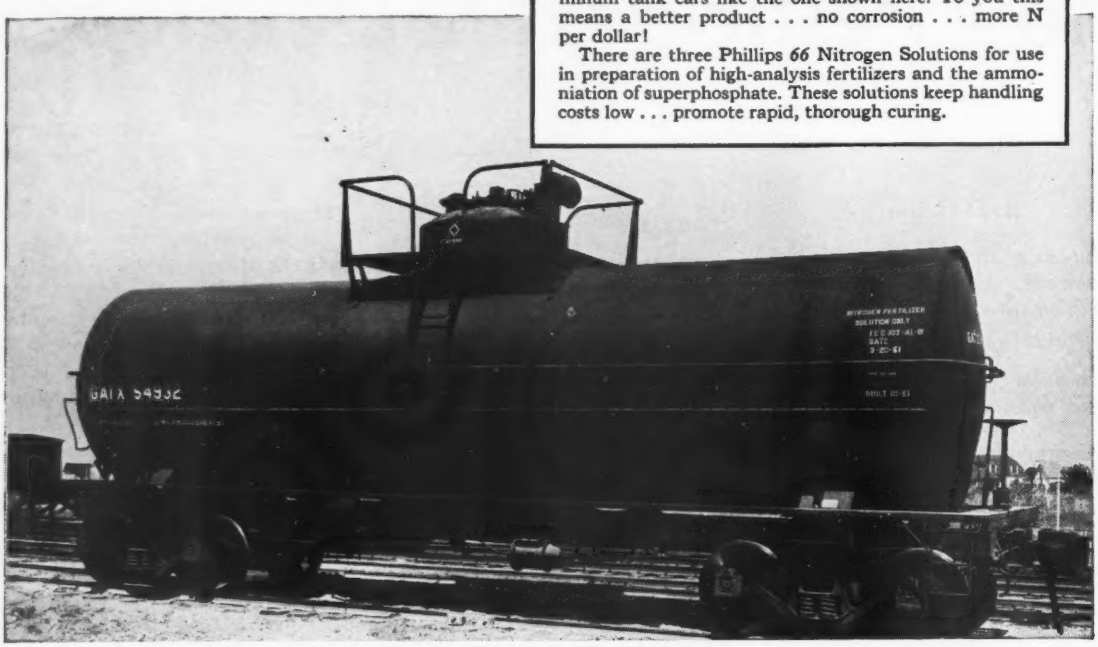

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pyrethrinlike ester. Here we are confronted not only with determining the purity of allethrin, but also developing methods which will permit determination of allethrin in the presence of pyrethrins. These are but two examples of typical problems which are in need of urgent solution and which cannot be solved by part-time effort by analysts burdened with a heavy routine schedule. Precise and accurate methods of analyses are especially important in law enforcement activities.

That there is world-wide interest in another problem—coined names for pesticidal chemicals having long and complicated technical names—is evidenced by the fact that at the Third International Congress of Crop Protection held in Paris recently there was a special session to consider the subject. After devoting a full morning to various aspects of the problem, the following recommendation was made to the Executive Council of the Congress:

Names Developed

This Congress having considered the problems arising in the nomenclature of the many complex substances used in the field of crop protection and the desirability of achieving world wide uniformity in the common names for these compounds, recommends:

1. That where they do not already exist, organizations should be set up by members of the congress in their own countries to adopt common names for chemicals used in crop protection.

2. That such organizations should establish close liaison with each other and with the International Standards Organization and with, if possible, the cooperation of the Committee of Phytopharmacy.

Probably the first intensive effort to develop coined names for pesticidal chemicals was made by the late Dr. Rohwer. Under the auspices of the Interdepartmental Committee on Pest Control, of of which Dr. Rohwer was chairman, coined names for eight insecticidal chemicals, five fungicides and one rodenticide were developed.

All the names developed are specific trivial names intended to define a definite pesticidal chemical. They are not generic names, as is sometimes stated. Superficially it may appear that the coining of suitable names is a trivial task. Experience gained over the past six years has shown that many factors need to be considered and that several groups having an indirect interest in pesticides need to be consulted if unanimity is to be achieved.

Experience with Chlordane

As an example of some of the problems involved, I shall cite the experience we have had with chlordane, the first name developed by the Interdepartmental Committee on Pest Control. The name emerged following a lengthy discussion between members of the Interdepartmental Committee on Pest Control and representatives of the then two producers of the product.

Chlordane was defined as 1,2,4,5,-6,7,8,8 – octachloro – 4,7 – methano –3a, 4, 7, 7, 7a tetrahydroindane. Technical chlordane was defined as a commercially produced chemical containing 60–75 per cent chlordane, together with 25 to 40 per cent of related compounds occurring in the normal manufacturing processes which are toxic to insects.

The group selecting the name agreed that the name and definition should be submitted to organizations interested in pesticides with the recommendation that the name be adopted as a standard. This was done and the American Medical Association and the American Association of Economic Entomologists indicated they had no objection to the name.

The editor of Chemical Abstracts, American Chemical Society, however, objected to the ending "ane" and proposed that the spelling be changed to chlordan. Shortly after adoption of the name "chlordane" an editorial appeared in Chemical and Engineering News, entitled "What's in a Name," and cited specifically chlordane. The editorial indicated its approval of coined names for chemicals having complicated technical names, but stated that in their selection the names "should conform to the principles of chemical nomenclature in regard to endings. The latter provision is important because the ending of a chemical name is indicative of the class of compounds to which it belongs."

Accordingly, the editorial went on to state that in American Chemical Society publications, the term chlordan would be used. In my opinion this arbitrary action is uncalled for. There is no relation between a trivial name and exact chemical nomenclature. Certainly not all names have chemical significance.

Although steps were taken in the patent office so that the name "chlordane" could not be trademarked in this country, the action did not prevent issuance of a trademark for chlordane in a foreign country. A trade-mark does not necessarily cover a specific chemical and can be used only with consent of the trade-mark registrant.

About two years ago one of the larger American insecticide distributors marketing an insecticidal preparation containing chlordane, in Cuba, was confronted with the fact that the term "chlordane" had been registered in that country by an individual and could not be used without his consent.

Certain necessary legal steps were taken to bring the facts to the attention of Cuban officials and the situation has been clarified—not, however, without expenditure of considerable time and expense. A similar situation was encountered by an American company marketing lindane in Egypt, where this name had been registered as a trade-mark.

Another Conflict

Last June the name "isodrin" was approved as a coined name for an insecticidal chemical produced by the J. Hyman Company. Shortly after announcement of its approval it was brought to our attention that nor-isodrin was the trademark of a drug sold by the Abbott Company. This company now is requesting that the name "isodrin" for an insecticidal chemical be reconsidered. Experience has also taught—with chlordane and some of the other coined names—that the name should be applied only to the 100 per cent pure chemical. These are but some of the problems encountered in the field.

In the spring of 1951 the Inter-

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departmental Committee on Pest Control decided to initiate a new procedure in regard to coined names for pesticidal chemicals. In the future the sponsoring organization will be requested to submit one or more names for a new pesticidal chemical that has reached the stage of commercial development. The name shall apply to the pure chemical and a suitable definition shall be developed for the technical or commercial grade.

Mixtures Excepted

As in the past, a name for a mixture of two or more chemicals will not be considered. The sponsoring organization also will be required to submit data on the value of the product for the purposes for which it is intended, together with pharmacological and other relevant data. The Interdepartmental committee believes it is desirable that the coined name be trade-marked and then released for use as a common name. Such a procedure, it is believed, will reduce the chances of having a coined name developed in this country registered as a trade-mark in a foreign country.

The foregoing procedure was used in developing the coined name, "malathon," for an organo-phosphorus compound produced by the American Cyanamid Company. In the development of coined names for pesticidal chemicals the committee will continue to cooperate with all groups having an interest in the field, and it has no desire or intention of usurping the prerogative of any organization.

Systemic Pesticides

Another subject of interest is systemic insecticides. The term is applied to insecticides which are taken up by a growing plant in quantities great enough to destroy insects that may feed upon the plant. In the case of animals where chemicals are introduced into the blood-stream for the control of external parasites, the terms "internal medication" or "inner therapeutics" have been used.

The subject is an old one and has intrigued workers for more than 150 years. First studies with plants concerned themselves with preservation of wood by introducing water soluble inorganic salts into the sap-stream. They were partly successful but the results did not warrant commercial exploitation. About five years ago, Schrader, working in Germany, found that certain synthetic organic phosphorus and fluorine compounds not only were toxic to some species of insects but were capable of absorption by plants which thereby became systemically insecticidal. Schrader found this property among widely-separated types of compound, the most effective being, on the one hand, certain derivatives of fluoroethyl alcohol—and on the other hand, certain alkylamoniophosphorus compounds.

Two Successful

Of the various systemic insecticides so far examined, octamethyl pyrophosphoramide frequently designated OMPA, has proved outstandingly promising and has been widely explored. Systox, the active ingredient of which is diethyl ethyl mercaptoethyl thiophosphate has also been found to act systemically. It is natural to inquire what requirements are for an insecticide to be a "systemic." British workers, who have probably exploited the field more extensively than other workers, state that a compound must be soluble in water.

This definition, however, is difficult to reconcile with experimental data showing that parathion, which is insoluble in water, is translocated in plants. Also, the experiments of Fulton and Mason, who found that when derris is applied to the first true leaves of bean plants, the leaves formed subsequently are less readily attacked by larvae of the Mexican bean beetle than are similar leaves of untreated plants.

Paris Congress

At the recently-held Paris Congress on Crop Protection mentioned above, Dr. Walter Ripper, an enthusiastic proponent of systemic insecticides presented a paper on the subject. In it, he suggested that systemics be divided into three classes—1. stable, 2. endolithic and 3. endo-mexatoxic. By stable systemics are meant such chemicals as sodium selenate, which is known to be taken up by plants and translocated but is not metabolized or broken down into an inert product.

Endo-lithic systemics are those compounds which are absorbed and translocated in the plant and which effect their toxic action in the same manner as when sprayed on plants, i.e. they act as unchanged chemicals to the extent of at least 98 per cent. Endometatoxic systemics are those compounds which are absorbed and translocated in the plant and are wholly or partly transformed to products toxic to insects feeding upon the plant.

Whether or not these terms generally will be accepted by the workers in the field of economic entomology remains to be seen. It is clear, however, that compounds which act systemically present numerous problems that need to be solved before they can widely be recommended for use by the public. Of the more promising systemics, it is known that they also are highly toxic to warm-blooded animals.

Persistence Time

It therefore, becomes necessary to determine the length of time they persist in the plants. Whether or not the degradation products are toxic to warm-blooded animals in those cases where there is evidence that the compounds are broken down or converted into products toxic to insects, it would appear that it will be necessary to isolate the chemical and determine its composition and effect on warm-blooded animals.

Although there are many challenging problems in the field of pest control greater progress has been made in the past decade in the control of injurious pests with chemicals than in all preceding years.

The advance in this field has had widespread and fundamental effects on agriculture in matters of improved production and quality of food. In the field of medicine the use of chemicals to control disease-carrying insects has had a profound effect in protecting and improving human health.

The values accruing to man through progress in the field are difficult to estimate fully, but one very evident result is a substantial increase in food, feed and fiber crops where pesticides have been applied. ◆

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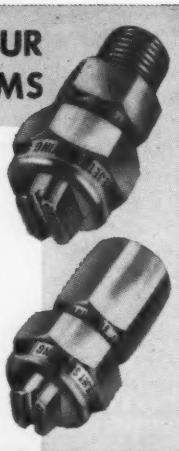

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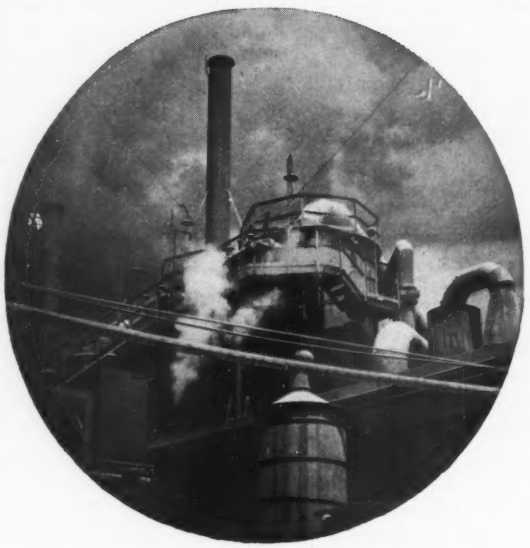

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12-2 New Clark Catalog

Condensed catalog of Clark materials handling equipment. Complete details on gas and electric powered lift trucks, attachments and gas powered towing tractors. **Code Number 12-2.**

12-3 Raymond Roller Mills

Raymond Roller Mills are compact, flexible installations for the grinding of all types of phosphate rock or insecticide dusts. They are noted for ease of fineness, adjustment and consistent finished products at any fineness specification. Catalog 69 offers complete details. **Code Number 12-3.**

12-4 New Multiwall Guarantee

The guarantee on Hudson multiwall bags now has been extended to cover damage on packing or closing machines. Get full information on this guarantee, the first of its kind in multiwall sack history. **Code Number 12-4.**

12-5 Soluble Fertilizer Materials

Four soluble chemicals from Monsanto are available for formulating liquid fertilizers. The increased availability of nutrients in these plant foods is developing new markets for fertilizer manufacturers. **Code Number 12-5.**

12-6 Ethyl BHC and Lindane

Ethyl Corp.'s BHC plant now is completed and extra high gamma and lindane facilities are nearly finished. Full information is available on the supply of all three pesticides they will have available for the 1952–53 season. **Code Number 12-6.**

12-7 FlexSpout Pail Closures

FlexSpout pail closures help you to sell more of any liquid pesticide or fertilizer packaged in steel pails. The unit is leak-proof, tamperproof and has a flexible pouring spout that extends for pouring, retracts for storage. Send for

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

- 12-1 Heptachlor
- 12-2 New Clark Catalog
- 12-3 Raymond Roller Mills
- 12-4 New Multiwall Guarantee
- 12-5 Soluble Fertilizer Materials
- 12-6 Ethyl BHC and Lindane
- 12-7 FlexSpout Pail Closures
- 12-8 Dustlube Collectors
- 12-9 Auto Printer for Multiwalls
- 12-10 Toximul Emulsifiers
- 12-11 Dry Batch Mixers
- 12-12 Granulating Fertilizers
- 12-13 Sharkraft Multiwall Bags
- 12-14 Formulating with Attaclay
- 12-15 American Brand Vermiculite
- 12-16 Tramp Iron Protection
- 12-17 Williams Hammer Mills
- 12-18 Material Handling Tractors
- 12-19 Automatic Liquid Scale
- 12-20 Reliance Motors
- 12-21 Thayer Scale

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brochure. **Code Number 12-7.**

12-8 Dustlube Collectors

Dustlube dust collectors have many applications in the production of farm chemicals. Folder shows installation in fertilizer and pesticide facilities o several prominent industry concerns. **Code Number 12-8.**

12-9 Auto Printer for Multiwalls

You can print your own shipping containers or multi-walls with Industrial's Auto Printer, handling up to 2400 units per hour. This and other coding and marking machines are described in a catalog. **Code Number 12-9.**

12-10 Toximul Emulsifiers

Toximul twins, 300 and 400, are anionic emulsifiers for all major pesticides, providing flash dispersibility and high stability in hard or soft water. Technical data sheet, other information and working samples. **Code Number 12-10.**

12-11 Dry Batch Mixers

For mixing substances of different weights or physical properties, dry, partly dry or mixtures of both Sturtevant dry batch mixers offer top economy. Unique design of mixing chamber and four-way mixing action provide a more rapid mixing job than other machines. Bulletin available. **Code Number 12-11.**

12-12 Granulating Fertilizers

Granulation is a process that has become of increasing interest to all fertilizer mixers. John J. Harte Co. has a descriptive folder on the "Granulation of Mixed Fertilizers" with a detailed discussion of the process. **Code Number 12-12.**

12-13 Sharkraft Multiwall Bags

All plies of Chase Sharkraft bags are crinkled to reduce costly breakage. The crinkling provides a sure grip for easier handling and better stacking. Available in 2 to 5 plies, described in brochure. **Code Number 12-13.**

12-14 Formulating with Attaclay

Booklet from Attapulgus Clay describes quicker, easier and better pesticide formulation using, of course, "Attaclay." Their carrier and diluent "takes the maybe out of pesticide processing." **Code Number 12-14.**

12-15 American Brand Vermiculite

American Brand vermiculite is readily available throughout the country permitting standardization of fertilizer formulae and is now a leading conditioning aid. Information available on this material which is screened after expansion to assure uniformity. **Code Number 12-15.**

12-16 Tramp Iron Protection

A Perma Plate magnet in the discharge chute of your bagging mill elevator can prove very profitable by removing nuts, nails, and other tramp iron. Non-electric, they are guaranteed permanent. Catalog available. **Code Number 12-16.**

12-17 Williams Hammer Mills

Williams Helix-Seal Hammer Mills providing dustless dry grinding and non-clog wet grinding are described in a new brochure. The units combine all advantages of an efficient hammer mill with a closed-circuit screw type feed. **Code Number 12-17.**

12-18 Material Handling Tractors

Phosphate, sulfur, chemical wastes and other bulk materials can be handled speedily, efficiently and economically by four sizes of Allis-Chalmers crawler tractors equipped with hydraulically operated buckets of one-yard to four-yard capacity. In addition these tractors may also be equipped with bulldozer blades when the job calls for bulk movement of materials either indoors or in large quantities outdoors . . . wet or dry. A descriptive catalog will be sent on request. **Code Number 12-18.**

12-19 Automatic Liquid Scale

Richardson Scale offers data sheet in automatic gravity-operated liquid scale. Includes complete engineer's drawings, operation information, capacity, rate of discharge data on special features for close-tolerance weighing. **Code Number 12-19.**

12-20 Reliance Motors

A four-page quick-reference bulletin, describing and illustrating its line of A-C and D-C motors has been issued by Reliance Electric & Engineering Co., and is available for general distribution to production managers, maintenance superintendents, machinery designers, electrical engineers and others interested in motors and related in-plant power-transmission equipment. Advantages and application of the products are given. **Code Number 12-20.**

Reader Service inquiries will be honored up to six months after date of publication of the magazine in which they appear.

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For fertilizer safety . . .

Multiple Shot Blasting Shown To Safety Men

John E. Smith, of Spencer Chemical Co., newly elected chairman of fertilizer safety section.

FERTILIZER manufacturers have much to gain from a plant safety program aside from the obvious benefit of protecting lives and reducing the injury rate of workers.

A good safety program also can mean improved public relations, reduction of fire and workmen's compensation insurance costs and reduction of operation costs by safer and more efficient methods.

Those factors probably explain the excellent attendance of industry personnel at the Fertilizer Section meeting in the Sheraton Hotel, Chicago, Oct. 22–23. The section is a branch of the chemical division of the National Safety Congress.

Although the section was formed only two years ago, it has grown rapidly in membership and interest in the industry.

Attendance High

More than 125 men attended each session of the meeting, representing plants all over the country.

Main feature of the meeting was a talk and demonstration of the multiple shot technique of blasting stored fertilizer. Conducted by Mark Withey, Trojan Powder Corp., two demonstrations were given in the plant of International Minerals and Chemical Corp. Withey pointed out the value of the multiple shot method in eliminating pile overhangs and decreasing hazards of application

In addition, fewer blasts are necessary because several times as much material is brought down with each blast than with single shot firing. Damage to buildings and bulkheads also is reduced as is the cost of explosives.

A seismograph was used during the blast to measure its intensity and to compare it with the vibrations emanating from asingle shot blast.

"Fire Prevention Through Design" was the topic of a talk by George C. Blair of the Fire Prevention Engineering Ebasco International Corp. He stressed importance of anticipating requirements and incorporating safety factors in construction and replacement. In another talk at the meeting, he discussed the importance of maintenance in preventing fires.

Other Speakers

Other facets of plant safety were considered by E. O. Burroughs Jr., Insurance Department, F. S. Royster Guano Co., and John Stark, of Grange League Federation. Stark replaced T. J. Clarke, also of G.L.F., who was absent because of business.

Burroughs used charts to illustrate his talk on housekeeping in fertilizer plants. The charts showed some of the common hazards which can lead to accidents in plants.

Proper method for conducting a safety meeting was presented by Stark, who used a novel quiz program technique to stimulate a question and answer session.

Other talks on safety by J. L. Rosenstein, University of Miami, and Herbert Walworth, Lumberman Mutual Casualty Co., were included in the two-day program.

John Smith, of Spencer Chemical Co., Pittsburg, Kan., was elected general chairman of the section, replacing J. S. Fields, Phillips Chemical Co.

Vernon Gornto, Smith-Douglass Co., Inc., was named vice chairman and Clarke was elected to the post of secretary. Before retiring as head of the section, Fields summarized the work of the section during the past year in helping make fertilizer plants safe. ◆

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Food and Agricultural Organization of United Nations gives report on

World Fertilizer Situation

WHILE figures for fertilizer production and consumption were breaking U. S. records for the 1950–51 season, a similar situation was prevalent throughout the world.

Total consumption of the basic plant nutrients—nitrogen, phosphoric acid and potash—jumped 700,000 tons in the season to a new high of nearly 14.5 million tons.

These figures are given in a world report on production and consumption of fertilizers for 1950–51, 1951–52 and 1952–53 put out by the Food and Agriculture Organization of the United Nations.

They reveal the interesting fact that increases in production and consumption are particularly high in areas of the world where the use of chemical fertilizers has been relatively small.

World Outlook

World outlook for the current year is an increase of 7.1 per cent in total production of all fertilizers and a rise of 8.6 per cent in total consumption of the materials.

There is good authority for the FAO figures. They are based on questionnaires completed by all the major producing and consuming countries in each continent, which include outlook figures for 1952–53.

The statistics for 1950–51 show that the greatest production increase was in nitrogen, which was up 9.2 per cent over the previous year.

Following was potash with a 3.6 per cent increase and phosphoric acid, 3 per cent increase.

New nitrogen facilities in Egypt accounted for the big gain in Africa, which led other geographical areas in percentage increase of fertilizer production. Next largest expansion was in Asia, 20.6 per cent, caused also by increased nitrogen production, in this case from Indian facilities.

Consumption of nitrogen and potash was up considerably during 1951–52. Nitrogen gained 8.6 per cent and potash 7.8 per cent while phosphoric acid showed only a very slight increase of 0.6 per cent.

Following is a summary of the important points included in the FAO booklet which are of interest to the fertilizer industry:

Nitrogen

An increase was felt in nearly all producing countries. There were two developments of particular significance.

For the first time in history, synthetic nitrogen fertilizers were produced in commercial quantities on every continent. Egypt turned out 27,000 tons of nitrogen and 180,000 tons of calcium nitrate, the first such production in Africa.

Asia showed a great increase in nitrogen production, on a percentage basis. The 18.6 per cent increase in 1952 production over that of 1951 was brought about chiefly by production of ammonium sulfate at the Indian Sindri plant and through boosted Japanese production of ammonium sulfate, ammonium nitrate and urea. Smaller increases also occurred in Japanese manufacture of ammonium chloride, nitrophosphate and ammonium phosphate.

During 1951–52 European increases amounted to 7.7 per cent and North America 9.1 per cent. South American nitrogen production, although still at a high level, showed a slight decrease.

Phosphates

Overall increase in production of phosphatic fertilizers was 3 per cent although superphosphate, prime source of P_2O_5 in most regions, showed but a slight (.7 per cent as P_2O_5) increase.

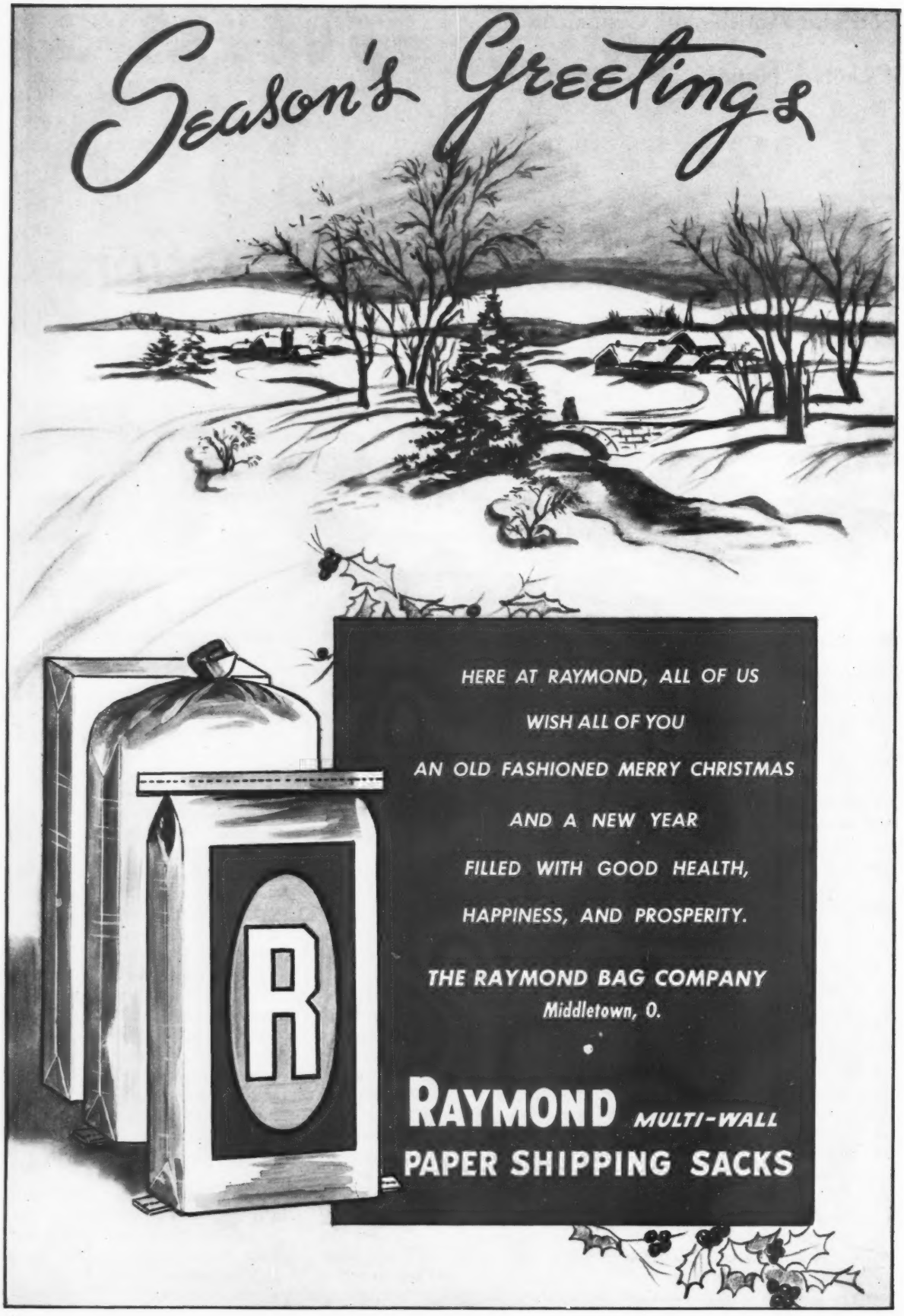
Superphosphate production declined in the United States, the Netherlands, the United Kingdom and in India but production in all other reporting countries was either the same as in 1950–51 or higher. Basic slag, an important European source, increased in supply.

Triple superphosphate capacity has increased considerably in many areas, including the United States, Netherlands, the United Kingdom, North Africa, Portugal, Greece and several other countries. This increased capacity may not be currently utilized to its maximum because of sulfur shortages.

Potash

Production, centered principally in Europe and North America, increased by approximately 3.6 per cent. Both regions showed a production increase during the year.

A trend toward a higher concen-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PAPER SHIPPING SACKS

tration of K_2O in potash materials has been noted. Increasing supplies of potassium nitrate now are being produced in Chile as a product of the new solar process for sodium nitrate production.

1951-52 Consumption

Consumption of the three major plant food elements is estimated to have increased by 694,000 tons or 5 per cent. Phosphates assumed major importance during the year and, although the total supply was higher than previously estimated, the available supply was insufficient to meet needs. This was especially true in those countries depending chiefly on superphosphate.

Some states of Australia adopted a policy of rationing superphosphate above certain minimum quantities. In South Africa it was diluted with rock phosphate and in New Zealand with a mixture of rock phosphate and serpentine.

Chief producing countries helped to meet needs in other areas to some extent at the expense of a somewhat lower home consumption. On the basis of reports from 14 European countries the estimated export surplus of nitrogen increased by about 30 per cent and increase in net P_2O_5 exports reached 60 per cent. Imports declined and consumption was about 1.9 per cent less.

Africa showed the largest increase in nitrogen consumption with a 124.3 per cent rise over 1950–51. Increases in potash consumption were particularly evident in Oceania, up 53.3 per cent and Asia, up 34.5 per cent.

More and more countries are realizing the benefits of chemical fertilizers and during the year consumption of nitrogen was reported from 88 countries and territories in all parts of the world. Consumption of phosphoric acid and potash was reported from 70.

Prices and Subsidies

Price levels of commercial fertilizers, as with those of most commodities, rose in many areas. In some regions the price of phosphates has gone up more than that of chemical ammoniates or potash. This may be attributed, in part, to the overall world shortage of phosphates.

Prices of organic ammoniates have shown the greatest increase and in many areas this may be a limiting factor in consumption during the current year.

The price trend is an important factor in implementing a greater consumption this crop year. Many governments, including those of Norway, Germany, Portugal and Austria, now are paying subsidies and in April, 1952 the United Kingdom restored them on phosphates.

Some countries, for example, Columbia, purchase and import their necessary fertilizer materials. Others, such as Uruguay, pay part of the freight on farmers' fertilizer shipments. Many countries are improving credit systems for the purchase of fertilizers. In the United States assistance is given for the purchase of fertilizers applied to certain crops grown in soil building programs.

International Trade

Data provided by UN member countries are insufficient to provide a basis for estimates of total world trade. However, enough have reported their imports and exports so that an outline of the trade position of the various continents is possible.

Europe—Based on reports from 16 western European countries, the continent is a net exporter of all three major plant foods. The export surplus of nitrogen increased by about 30 per cent in 1951–52 and reports indicate a continued, though smaller increase, during the current period.

Paralleling strongly decreased imports, lower consumption rates and a somewhat higher production, a large increase in net exports of phosphoric acid, nearly 60 per cent, was noted. Indications are that during the current year the export surplus will be less than last year but over that of 1950–51.

North America—A net importer of approximately 60,000 metric tons of nitrogen per year and of more than 200,000 tons of potash. It is a net exporter of phosphoric acid.

South America—Still a large-scale world supplier of nitrogen.

Asia—In spite of increased production the rate of all fertilizer imports still is increasing. During 1951–52 imports of N, P_2O_5 and K_2O were respectively about 25, 100 and 40 per cent higher than during the previous year. It is indicated that the increase will continue during the current period.

Africa—A net importer of nitrogen and potash with a reported annual rate of about 130,000 and 12–13,000 metric tons respectively.

Oceania—Net importer of all fertilizers, annual imports amounting to about 10,000 metric tons P_2O_5, 10,000 N and 15-20,000 K_2O.

1952-53 Outlook

Increases in production of all three major plant food elements are anticipated. The largest will be in potash production, up 8.8 per cent, then nitrogen, 7.4 per cent and phosphoric acid, 5.6 per cent.

On the basis of individual fertilizers, greatest increase in production will be the following: potash in North America (17.9 per cent), phosphoric acid in Asia (13.1 per cent), nitrogen in Asia (11.8 per cent) and phosphoric acid in North America (10.5 per cent). The average world increase is expected to be 7.1 per cent.

In sharp contrast to these increases is the outlook for superphosphate production in Oceania. There, because of an anticipated shortage of sulfur, super production is expected to be down 11 per cent from the 1951–52 period.

Consumption outlook for all fertilizers is for an average world increase of 8.6 per cent. This increase is dependent on a number of factors including the world level of fertilizer prices, possible changes in level of agricultural prices, export-import problems and transport costs and facilities.

Experience has shown that there is a rough balance between the plant foods used; therefore, on the whole, amounts of nitrogen and potash that can be successfully used during the year depend to some degree on the availability of P_2O_5 sources. This will be especially true in countries using all three nutrients.

World Trends in Production

1. Increasing world production of materials supplying higher concentrations of NPK.

Nitrogen—Production of higher analysis nitrogenous fertilizers in

North America, Europe and Japan is increasing. Included are materials such as anhydrous ammonia, ammonium nitrate and ammonium phosphate.

Canada produces ammonium nitrate, ammonium sulfate, ammomium phosphate (11–48–0 and 16–20–0) and cyanamid. In Europe the proportion of solid nitrogen produced for agricultural purposes is much larger than in North America.

Eleven western European countries reported total production during 1951–52 of 1,965,815 tons of nitrogen consisting principally of ammonium sulfate, ammonium nitrate and calcium nitrate. Other nitrogen forms produced in lesser quantities include cyanamid, sodium nitrate, ammonium phosphate, urea, urephoska, nitrophoska, nitrophosphate and other material.

A very substantial part of Asiatic production is supplied by sulfate of ammonia. Other materials manufactured there include cyanamid, urea, ammonium nitrate, ammonium chloride, ammonium phosphate and recently in Japan, small tonnages of nitrophosphate.

Latin American production consists of the natural sodium nitrate and, more recently, ammonium sulfate. Oceania manufactures ammonium sulfate and Africa, calcium nitrate. In the latter two regions, the nitrogen form produced is decided, in part, by the most suitable indigenous materials available.

Potash—Concentration of K_2O in potash fertilizers has increased considerably in recent years. Substantial tonnages of 60 per cent muriate of potash are produced in Europe and it is the most important grade in France.

Manure salts represent the largest tonnage of potash fertilizer made in Germany. Kanit also is used.

For the world as a whole, chlorides of potassium have comprised an estimated 90 per cent of total production and the sulfates the remaining 10 per cent.

2. Production of phosphatic fertilizers requiring the minimum of, or no sulfur.

Superphosphate still is by far the most important source of phosphate but there is increased interest in the production of nitrophosphates, especially in areas where sulfur is a limiting factor. This class of material is being produced commercially in increasing amounts in Europe and several plants soon will be under construction in North America.

Other kinds of phosphatic fertilizers not requiring sulfur include defluorinated phosphate rock, as fused tricalcium phosphate, made by melting the rock in the presence of silica and water vapor to volatilize the fluorine and increase P_2O_5 availabil'ty.

Rhenania phosphate is made by heating raw rock at high temperatures with alkali salts, usually soda ash and silica. Germany produces two types of this product, fused phosphate (Palitia) and magnesium phosphate of lime (Camaphos). Chile also produces Rhenania type phosphates by heating apatite with sodium nitrate and by fusing apatite with sodium sulfate, lime and charcoal.

Calcium metaphosphate, produced in increasing quantity in the United States, is made by causing the rock to react directly upon phosphoric acid at high temperatures.

Other recent developments include the manufacture of "fused phosphates" in Asia (Japan) and Taiwan. In Africa, "Soda phosphate," is made in Kenya and capacity is currently being doubled. This is made from Uganda phosphate (Apatite) using only soda ash at a low temperature of 900° C. The Taiwan product is a serpentine fused phosphate.

3. Modernizing methods of natural resources utilization for fertilizer material production.

Of outstanding importance to nitrogen supply is the modernization of the Guggenheim process in Chilean nitrate production. The process has been further developed to recover value from the tailings which were discarded previously after leaching out the sodium nitrate and part of the iodine.

These tailings contain 25 per cent of the nitrate in the original ore and all of the remaining salts. Now a solution of the tailings is subjected to fractional crystallization in solar evaporation ponds producing potassium nitrate and other materials.

Another example has been the application of new methods of guano production in several countries, especially Peru. By conservation methods, the decline in production of white guano has been stopped and output again is increasing.

To produce fertilizers of higher concentration a mixing plant has been built in Lima where guano and high analysis chemical materials are used to produce fertilizers.

4. Improvement in physical condition of fertilizers.

Improvement through pelleting and granulation to facilitate storage and application has been further developed. Especially notable is the improved condition of ammonium nitrate since it first appeared on the market.

Conclusion

The current trend in greater production and consumption began during the postwar rehabilitation period. By 1946–47 both had once again reached the 1938–39 level. Since then a steady increase in total volume has been recorded.

Increased demands for fertilizers can be fully met chiefly in the countries of Western Europe, North America, Asia (Japan) and a few others.

Improvement in supply is being undertaken in many ways, through conservation of natural organic materials, better methods of natural resources utilization, development of new sulfur sources and surveys to locate new bodies of raw materials.

Alternate Method

Countries short of usual high-grade ores are using indigenous raw materials to manufacture other than conventional types of fertilizers such as the serpentine fused phosphate of Taiwan and soda phosphate in Kenya.

The search for suitable raw materials and their successful utilization as fertilizers is considered a matter of growing urgency in improving the agricultural supply. ◆

Versatility of Velsicol's new insecticide causing many formulators to use

Heptachlor

MANY formulators of pesticides are preparing to manufacture Velsicol's new insecticide Heptachlor in dust and emulsion concentrates, and for good reason.

For the versatile insecticide, which recently was given label registration for use in the control of several important cotton insects, is the latest in the corporation's series of synthetic chlorinated hydrocarbons, and if Velsicol's predictions are accurate Heptachlor should take its place as "one of the most adequate aids in the control of harmful and costly insect pests."

The chemical now is available for formulation and commercial application. In addition to being a potent foe of cotton insects Heptachlor shows promise of giving excellent control against a large number of other insects, as well.

Years of Testing

Introduction of the chemical to the industry was not sudden. It followed years of experimentation and testing. In fact development of Heptachlor is a striking example of the intensive program all pesticide manufacturers must carry out before marketing a product or making it available for formulation.

Full name of the chemical to which the name Heptachlor was assigned by the U.S.D.A. is 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro 4, 7-methanoindene. In its pure form it is a white crystalline substance containing 66.5 per cent chlorine.

Technical Heptachlor, the name which designates the commercial product, contains 67 per cent Heptachlor and 33 per cent related compounds. It is a soft waxy solid at a temperature of 25° C. with a melting point between 115° and 165° F. The technical material is soluble in any of the aromatic hydrocarbon solvents, but is not soluble in water.

Velsicol tests show that Heptachlor is compatible with most of the commonly used insecticides and fungicides including DDT, Chlordane, dusting sulfur, BHC, toxaphene, dinitro compounds, dithiocarbamates and quinones. It can be formulated as a dust, wettable powder or emulsifiable concentrate. Heptachlor also can be formulated in combination with DDT and dusting sulfur. The company states that plant production tests show a 25 per cent dust concentrate is a most advantageous basic preparation which can be cut back with inorganic diluents to the desired concentration.

For a carrier a blend of 40 per cent diatomaceous earth and 60 per cent Fuller's earth type clay has been found to provide excellent results.

First Tests Promising

Heptachlor was released for preliminary screening six years ago. First tests with the material were promising and indicated the compound had remarkable insecticidal properties against a wide variety of insects with very small dosages.

A much wider testing program was indicated, so the company provided supplies of the chemical for U.S.D.A. experiment stations, university and state experiment stations and many other field and research laboratories. Formulations showed effectiveness against many cotton pests.

It acts as both a contact and stomach insecticide and kills sucking and chewing insects. Effectiveness has been demonstrated against the cotton flea hopper, tarnished plant bug, rapid plant bug, alfalfa weevils and grasshoppers.

Included in the registration for the material are the cotton boll weevil, cotton fleahopper, tarnish plant bug and rapid plant bug. A wide variety of other insects has been tested with Heptachlor during the past few years with considerable promise.

In regard to the important questions of phytotoxicity and off-flavor, tests showed no plant injury and no traces of off-flavor or impairment of natural flavor.

To get more technical information on Velsicol's Heptachlor, including recommended formulations and application rates, fill out a **Reader Service** card, using code number **12-1.**

1000 pounds of 10-10-10 plowed down nearly doubles corn and potato yields for Leon Epler,

NORTHUMBERLAND, PA.

● Until 1948, Leon Epler of Northumberland, Pa., was getting corn yields of 40 to 50 bushels per acre by using approximately 250 pounds of row fertilizer. But that year he began plowing down 1000 pounds of 10-10-10 in addition to the row fertilizer. His yield jumped to 70-75 bushels per acre.

He climaxed this outstanding production in 1950 with a plot that yielded 122.1 bushels per acre in the Five Acre Corn Club contest sponsored by the Pennsylvania Crop Improvement Association. The special fertilizing program used on this plot included 10-10-10.

Plowing under 800-1000 pounds of 10-10-10 gave Mr. Epler equally outstanding results on potatoes. His average yield jumped from 300-350 bushels per acre to 500-550 bushels. Improved spraying and cultural methods also played a role in this increase.

Bigger yields for farmers mean better business for you

● On all types of crops, high-nitrogen complete fertilizers are paying for themselves over and over through higher quantity and better quality yields.

Every bumper crop produced by high-nitrogen fertilizers increases the demand for these products. And now is the time for you to cash in on this demand by putting heavy promotional effort behind the high-nitrogen fertilizers in your line.

When you use U·S·S Ammonium Sulphate in your mixed fertilizers, you'll find the selling job easier. Farmers know the name "United States Steel" stands for top quality. Many of them have used U·S·S Ammonium Sulphate as a straight-nitrogen material . . . they know it's dry and free-running . . . they know it won't set up in storage and that it handles well in distributing equipment.

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Exceptional quality of Hudson Multiwall Sacks permits unusual guarantee

PALATKA, FLA. Heretofore each Multiwall Sack user has individually absorbed the cost of any sacks which break on his filling and closing machines. But now, Hudson becomes the first and only Multiwall Sack manufacturer to guarantee to replace such broken sacks at no further cost.

According to experts, the average user of Multiwall Sacks normally expects to write off the loss of certain sacks during each day's run. These sacks are damaged due to circumstances beyond control of the Multiwall Sack manufacturer. Overloading of sacks, malfunction of packing or closing machines, or inattention on the part of the operator are some of the common causes of sack breakage.

Hudson is confident that the quality of the Multiwall Sacks they produce can eliminate most of this breakage. That is why they are willing to offer you complete protection through filling and closing operations. Only a company with a superior product would dare offer their customers such a guarantee.

First in industry to offer this replacement guarantee

T. H. Mittendorf

NEW YORK CITY. "Hudson is the first and only Multiwall Sack manufacturer to offer a written replacement guarantee on breakage of Multiwall Sacks," declared T. H. Mittendorf, Hudson's Vice President in Charge of Sales. "Hudson Multiwall Sacks lead the industry as being the world's most fully guaranteed. We believe they represent the best buy on today's market."

"Under the terms of our unusual guarantee the buyer is protected from the moment he accepts custody of the sacks until the sacks have successfully passed his filling and closing operations. This guarantee greatly extends our usual warranty of quality and workmanship," Mr. Mittendorf pointed out.

Hudson Representative, Harry Rafferty (center), points out the packing and closing operations covered by Hudson's new guarantee, to J. Dummett (left), Plant Supt. for Wedron Silica Company.

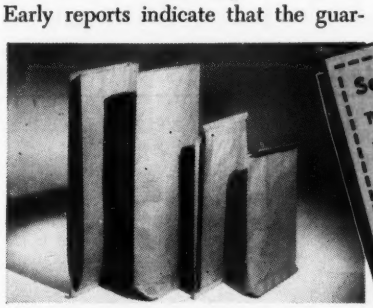
Goes into immediate effect

The new Hudson guarantee plan went into effect with all sacks purchased on or after Sept. 15, 1952. Early reports indicate that the guarantee is being enthusiastically received.

Prompt delivery on all contracts are assured by the tremendous capacity of Hudson's fully integrated mill at Palatka, Fla. High quality is maintained through inspection and controls at every step from tree to the finished Hudson Multiwall Sack. Hudson packaging engineers see that sacks conform to the exact needs of each user.

Urge Multiwall Sack users to write for facts

The Hudson Pulp & Paper Corp. invites all users of Multi...cks to learn how th...y by usin...iwall ...tee ...cts ...y ...s, and ...y are promised!



Hudson Multiwall Sacks are available pasted or sewn, and in valve and open mouth styles.

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Grassland Program Outlined to Agronomists

Chapman's paper is one of many presented at Agronomy meeting

MEMBERS of the American Society of Agronomy heard top agronomists, soil scientists and weed specialists from all over the country present papers on a wide variety of subjects at the 46th annual meeting of the group Nov. 17–21.

Together with the Soil Science Society of America, the society convened in the Netherland Plaza Hotel, Cincinnati, O.

Speaking before the group, Prof. C. C. Chapman, University of Wisconsin, again stressed the need for a grassland fertilization program on Wisconsin farms.

He reported on a large scale field demonstration set up in 1951 and continued through this year in which acre-scale plots were set up to show benefits of 10–10–10 on grasslands.

Grasslands Program

Chapman pointed out the intensive program of publicity given to the programs through the farm press, radio, teaching agencies and fertilizer salesmen and said the efforts had aroused a tremendous interest in the fertilizer grade.

The Wisconsin soils expert stated that pastures in that state have been a neglected crop and that the 10–10–10 program looks like a natural. He told the society that he was convinced there are thousands of acres of pasture in Wisconsin and other midwest states where the application of nitrogen with minerals will be found highly profitable.

Space doesn't permit review of all papers presented to the Society. Farm Chemicals has abstracted briefly those considered of special importance to the industry. Many other divisions met during the three-day session including those on breeding, physiology, crop production, turf, soil microbiology, soil morphology and technology.

M. A. Sprague, Rutgers University, reported on the use of sodium trichloroacetate in pasture renovation. Small amounts of the chemical were used to kill well established and closely grazed Kentucky bluegrass sods. He said this facilitated seedbed preparation with much less tillage and reduced competition while seedlings were becoming established.

This method of seedbed preparation was said to be particularly applicable on areas where tillage operations are ineffective or hazardous. Endothal, dinitros, sodium arsenite and CMU also were tried but were not as effective.

A total of nine papers were presented before the ASA Crop Science division. Members of the group heard L. W. Rasmussen, Washington State College, report on the effectiveness of 2,4-D and 2,4,5-T in Canada Thistle control. Rasmussen said stand densities were reduced more by treatment with 2,4-D than 2,4,5-T, according to experiments begun in 1948.

Herbicide Treatments

Experiments also showed that treatment at the bud stage was most effective although bloom stage treatments were nearly equal. At the end of three years there were in most cases only one or two scattered shoots remaining on the bud-stage 2,4-D treated plots.

Ester formulations were used at the rate of 1.2, 2.4 and 3.6 pounds acid equivalent per acre.

Fall or spring applications of IPC were found by A. S. Newman and H. T. DeRigo, Biological Laboratories, to be less injurious to crops than winter applications. Spray and dust formulations were reported of equal effectiveness with the comparative effectiveness of spray, dust and pellet formulations dependent on soil moisture conditions at the time of application and shortly thereafter.

More Effective

The two researchers found that sprays of isopropyl-(3-chlorophenyl) carbamate were generally more effective than IPC sprays.

W. R. Schmehl and E. Brenes reported to the soil fertility section of the Crop Science Division on the use of Rhenania phosphate. The

German material is rock phosphate sintered with sodium carbonate and silica at 1200–1400° C.

In tests on calcareous soils in Western areas it has been found that the material produces crop yields equal to those obtained with concentrated superphosphate when the fertilizer was mixed with the soil. Yields were somewhat less when placed in concentrated bands.

Laboratory studies using various extracting solutions for the determination of available phosphorus have shown the Rhenania phosphate and superphosphate to have similar solubilities.

Both the soil chemistry and soil fertility sections of the society heard a number of papers; many of them of special interest to the fertilizer industry.

Of Industry Interest

Two soil scientists from Iowa State College, George Stanford and H. R. Meldrum, reported on the effectiveness and recovery of phosphate and potash fertilizers topdressed on meadows with soil very low in available forms of both nutrients. Data showed very efficient recovery of the applied phosphate with considerable variation in the phosphorus content of plants in untreated and heavily treated areas.

Apparent recovery of the applied potash was as high as 100 per cent in several cases and there were indications that even the maximum application of 180 pounds K_2O per acre during a two year period was not sufficient for maximum yield.

Proteins Increased

Experiments carried out on hard red winter wheat by J. C. Williams and F. W. Smith, Kansas State College, showed that protein content was increased by several fertilizer treatments using nitrogen alone or in combination with phosphate and/or potash materials. This was most pronounced with heavier applications of nitrogen.

At one location the inclusion of potash also increased the per centage of protein but had no effects at other locations on either per cent or yield of protein. Phosphorus, however, increased yield but decreased percentage of protein, the apparent reversal probably being caused by the influence of phosphorus on the yield of grain which is reflected in protein yield. Type of carrier had no effect on per cent of yield of protein.

A corn hybrid with known susceptibility to stalk breakage was grown by Harry Wittels and L. F. Seatz, University of Tennessee to determine the time and rate of potash fertilization on yield, amount of stalk breakage and potassium and calcium composition on various plant portions. Two nitrogen rates were used.

Potash Experiments

Stalk breakage was reduced by potash applications at the high nitrogen level but not at the low level. With large nitrogen applications up to 40 pounds K_2O per acre reduced stalk breakage but higher rates had no effect.

Potash content of the plants was directly related to rate of potash application and, for each treatment, was approximately the same at the two nitrogen levels. Three methods of potash application showed no difference in effect on the factors studied. A reciprocal relation between the potassium and calcium content of the plants was noted.

Residual effects of phosphorus and lime on cotton determined with radioactive phosphorus, was the basis for a paper presented by Matthias Stelly and H. D. Morris, University of Georgia. Their experiments were carried out to get information on the residual effect of phosphate fertilizer used in 1949 at different rates and applied in drill versus broadcast and the effect of liming in that year on the availability of the phosphorus under those conditions.

Cotton was grown during 1951 in Cecil sandy clay loam which received tagged superphosphate at the equivalent of 28.5 pounds P_2O_5 per acre.

Increases in seed cotton yield and phosphorus content of the plant were found with the responses apparently directly related to the amount of phosphorus in 1949 and to the dilute acid soluble phosphorus in the soil at time of planting. An 11 per cent mean yield increase because of liming was obtained.

Mean yield differences between method of phosphate application were in favor of drilling especially when no lime was applied. A slightly higher plant phosphorus content resulted from liming when the phosphate was drilled.

Approximately 28 per cent of the plant phosphorus was derived from the fertilizer applied in 1951 to soil which had received no phosphorus in 1949. Percentage of phosphorus in the plants derived from the fertilizer applied in 1951 decreased sharply and directly with increases in rates of phosphorus additions in 1949.

Lime and Phosphorus

Liming had little or no effect on the percentage of phosphorus in plants derived from 1951 fertilizer applications. It appeared that the phosphorus which had been drilled in limed soil during 1949 was more available than that which had been applied broadcast.

Fertilization with potash and phosphate was shown to change the chemical composition of alfalfa in experiments recorded by R. K. Stivers and A. J. Ohlrogge, Purdue University. Four rates of phosphate and four of potash, in all combinations, were applied to alfalfa at the beginning of two- and three-year experiments. From 0 to 200 pounds P_2O_5 and 0 to 400 pounds of K_2O per acre were used.

Phosphate fertilization resulted in increasing phosphate content from 0.15 per cent to 0.22. Potash fertilization increased potassium content from 0.85 per cent to 1.51.

Different Yields

No positive yield response to phosphate was found on one soil series but was large on another; the difference directly related to available phosphorus in the two soils at the beginning of the experiment.

Stand maintenance of the alfalfa was closely related to both potash fertilization and the potassium composition of the alfalfa.

Yield was positively correlated with stand but yield and potassium content were not consistently related in all cropping years. ◆

A WHOLE FARM THRIVES ON NOURISHMENT

It's nourishment that makes little-ones into big-ones. And on the farm this applies to all living things . . . poultry . . . grain . . . man himself.

The soil is the basic source of all nourishment, yielding the vital plant-food elements upon which growth depends. These rich ingredients drained from the land must be replenished regularly if the soil is to satisfy the demands made upon it.

Many of the most effective soil-replenishing fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. Potash supplies nourishment to the soil, strengthens crops by helping them to resist drought and diseases.

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FERTILIZER MATERIALS MARKET

New York

November 10, 1952

Sulfate of Ammonia

Although this situation is slightly easier than a month or so ago because of recent foreign offerings, some trade authorities still believe a shortage will be possible in the spring. Foreign material is offered at $52 per ton, ex-vessel Atlantic ports.

Nitrate of Soda

Importers are now carrying stocks at most ports and the supply situation is improved.

Ammonium Nitrate

This material still remains scarce but domestic producers are trying to keep up with expected spring demand.

Urea

Some imported material now is available for forward shipment at around $125 per ton at Atlantic ports.

Nitrogenous Tankage

Most producers are sold out for the balance of the fertilizer year but some imported material is available at slightly higher prices. Demand has been good for this class of material.

Organics

Organic fertilizer materials displayed a mixed price tone. Because of lack of buying from feed trade, vegetable meals in general were easy in price with the possible exception of linseed meal which was hard to locate at the ceiling price of $78 per ton in bulk f.o.b. Minneapolis. Soybean meal for nearby shipment was available around $76 per ton in bulk, f.o.b. Decatur, Ill., and cottonseed meal at most points was selling several dollars per ton under the ceiling. Tankage and blood last sold at approximately $7.25 per unit of ammonia ($8.82 per unit N), with demand limited.

Fish Meal

Although production of menhaden has about ceased at most fish factories in the North, there still were some scattered lots of fish scrap offered at domestic ceiling prices. Imported fish meal is moving slowly at present, with offerings at approximately $130 per ton at the ports.

Bone Meal

Due to several new government regulations, no raw bone meal may be imported. Steamed fertilizer bone meal was firm in price but feeding bone meal is in plentiful supply at prices around $65 per ton at the ports.

Hoof Meal

This market remains steady at about $7 per unit of ammonia ($8.51 per unit N), f.o.b. Chicago, but fertilizer buyers are not showing too much interest.

Superphosphate

The supply of this material has increased to a point where no shortage is possible at present. There have been several large inquiries in the market recently for export.

Potash

With a new producer expected to start shipments this month, a better supply picture is in the making and little shortage is expected. Shipments are going forward against existing contracts with no price changes noted.

Garbage Tankage

Most of this material is under contract for the balance of the fertilizer year and offerings are rather limited.

Cocoa Shells

With production increasing recently, a better supply of cocoa shells were available and demand continues good.

Philadelphia

November 10, 1952

The situation in raw materials is more or less quiet but the suggestion of scarcity of some items still continues in the face of fairly free offerings and limited demand. Foreign products are now more in line with domestic prices and mixers at this time should not have too much trouble in covering their requirements. It is expected that farmers may have to pay a little more for their fertilizer this new season than last.

Sulfate of Ammonia.—Shipments are reported moving directly from production to contract consumers with no price changes reported. Foreign material is freely offered and at prices now more in line with domestic costs.

Ammonium Nitrate.—Demand continues ahead of production, with infrequent resale offerings. These are not too eagerly bought up, because extra handling and other charges are necessarily included.

Nitrate of Soda.—Normal seasonal situation prevails, with ample supplies to meet requirements. No change in price.

Blood, Tankage, Bone.—Packinghouse by-products are presently weaker, and demand is limited. Blood is quoted at $7.50 to $7.75 per unit of ammonia ($9.12 to $9.42 per unit N) here in the East, and $8 ($9.72 per unit N), Chicago. Tankage is offered at $7 ($8.51 per unit N) in the East with $8 to $8.25 ($9.72 to $10.02 per unit N) as the Chicago price. Bone meal is quiet and while quoted nominally at $75 per ton for steamed grade, there have been sales at $5 or more under this price.

Castor Pomace.—This continues to be in quite limited supply with price unchanged at $37.25 per ton in bags.

Fish Scrap.—Market is quiet with menhaden meal quoted at the full ceiling—$135.60 per ton. Imported meal offers strong competition.

Phosphate Rock.—High grade is reported tight, but domestic contract shipments of the lower grade continue active.

Superphosphate.—Shipments against contracts comprise the principal movement. There appears to be no immediate indication of severe shortage. Production is ahead of last year, and ample foreign supplies are reported.

Potash.—Movement reported heavy against contracts and producers seem quite satisfied with existing conditions. Production in Europe continues to increase and serious competition from that source may be looked for in the coming few years.

Charleston

November 10, 1952

Superphosphate continues in fairly comfortable position for the time being but is expected to tighten somewhat in the early spring. Potash supplies appear to be adequate for the fall. Some forms of hard nitrogen continue scarce with other forms in apparent adequate supply.

Organics.—Interest in fertilizer grade organics is rather quiet with a limited tonnage of domestic nitrogenous for fall and spring shipment available. Prices for domestic nitrogenous tankage range from $4.60 to $5 per unit of ammonia ($5.59 to $6.08 per unit N), bulk, f.o.b. production points. Offerings of imported nitrogenous tankage are light at approximately $6.15 per unit of ammonia ($7.48 per unit N), in bags, c.i.f. usual Atlantic ports, for late fall arrival.

Castor Pomace.—Current production is quoted at $37.25 per ton in burlap bags or $2 per ton less in paper bags, f.o.b. northeastern production point. One producer is sold up for the foreseeable future but limited supplies are available from another producer. Imported material varies in price from $40 to $45 per ton ex-vessel Atlantic ports.

Blood.—Dried unground blood, in bulk, is held at Chicago at $7.75 to $8 per unit ammonia ($9.42 to $9.72 per unit N), f.o.b. Chicago area. The New York market is rather quiet at prices around $7.75 ($9.42 per unit N), f.o.b. New York.

Potash.—Demand continues steady, generally, and movement against contracts normal. No changes in prices have been noted recently and interest for imported material is relatively quiet.

Ground Cotton Bur Ash.—This source of potash, primarily in the form of carbonate of potash, is available for prompt and spread shipment at prices approximating the delivered cost of domestic sulfate of potash. Analysis is usually 38 per cent to 45 per cent, averaging about 41 per cent K_2O.

Phosphate Rock.—Demand continues steady with both high and low grade stocks not too plentiful. Lifting of restriction on sulfur may tend to increase the demand for rock.

Superphosphate.—Supply conditions continue relatively comfortable and the improved availability of sulfur should help production considerably. Prices remain at ceiling levels.

Sulfate of Ammonia.—Stocks continue to be moved out as produced from domestic sources and demand is strong. Imported supplies are helping the general supply situation with prices on imported ranging from $52 to $55 per ton, f.o.b. cars Atlantic ports, in bulk.

Nitrate of Soda.—Stocks of imported material are being built up in anticipation of the season's demand. At this point supplies are expected to be adequate. No change in prices has been announced.

Calcium Ammonium Nitrate.—Imported supplies of this form of ammonium nitrate, testing 20 to 21 per cent nitrogen, are beginning to arrive and one importer is reported sold out for the season. Other importers will have supplies for fall and spring delivery from Wilmington, N. C., Charleston, S. C., and Braithwaite, La., possibly other ports in view of recent lifting of restriction by the Coast Guard. Price is $51.25 per ton, f.o.b. cars at dock, bagged in 100 lb. paper bags.

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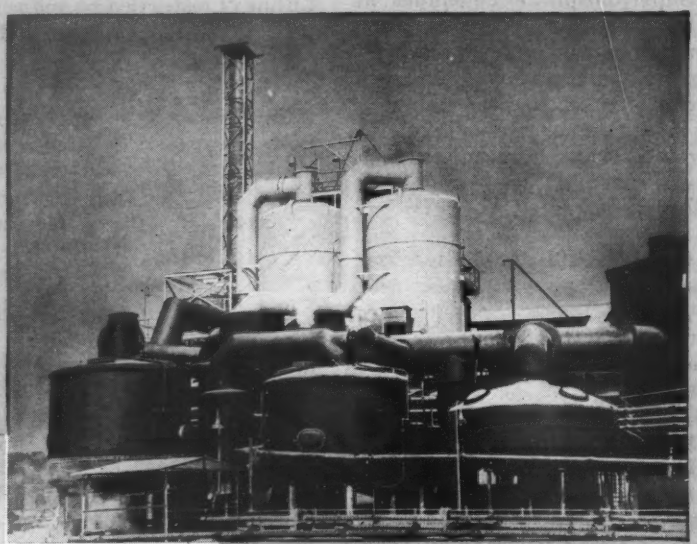

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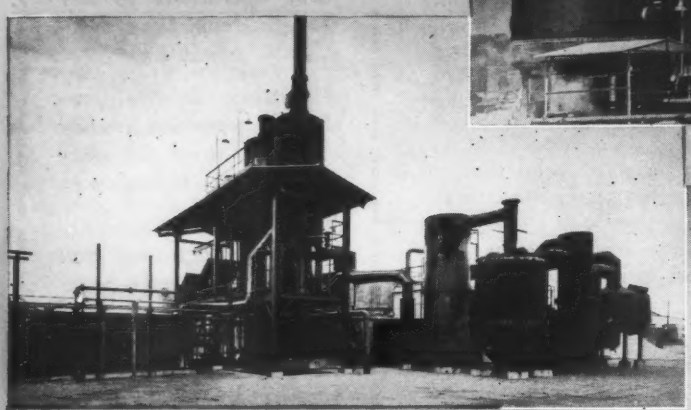
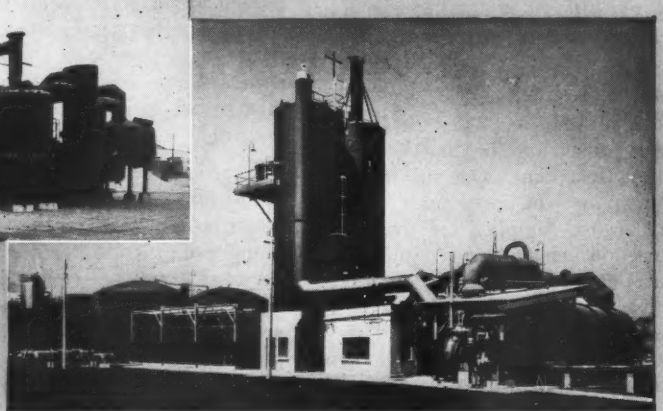


50 Tons



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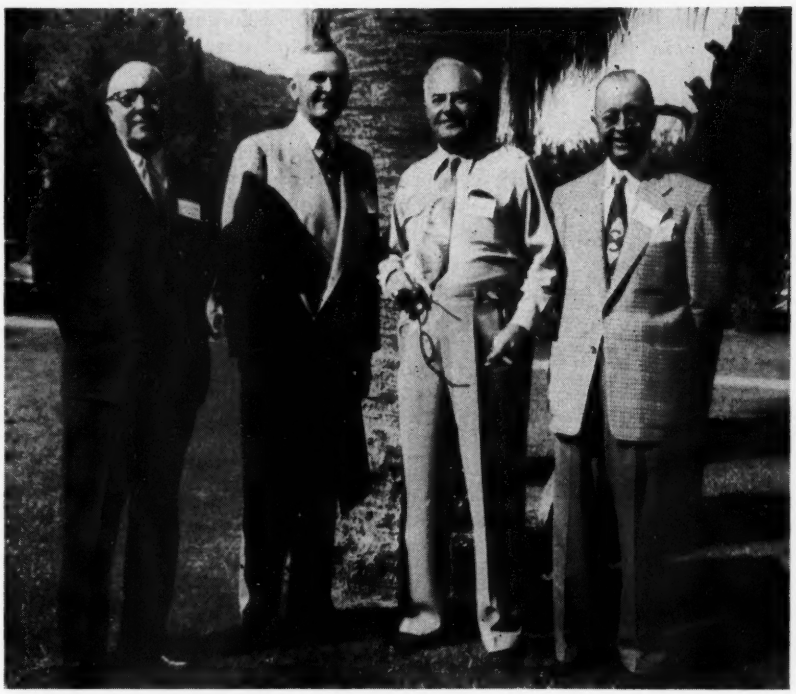

Four charter Calif. Fert. Assoc. members get together at recent Palm Springs convention. From left: George P. Bloxham, Pacific Guano Co.; Weller Noble, Pacific Guano Co.; Sidney Herzberg, Ontario Fert. Works and T. Walter Houser, So. Calif. Fert. Co. In photo at right, Mayor Charles D. Farrell of Palm Springs welcomes delegates.

THE amazing jump in fertilizer usage in California in the past decade was described by Weller Noble at the annual convention of the California Fertilizer Association.

Noble, president of Pacific Guano Company, Berkeley, was one of many speakers before the convention, held Nov. 10, 11 and 12 in The Desert Inn, Palm Springs, Cal.

A record attendance of 400 fertilizer officials, from California and Canada, Chicago, New York and Washington as well, attended the three-day meeting.

Noble compared the 216,735 tons of fertilizer used in 1940 with last year's total of 731,400 and said the 237 per cent increase was made possible by efforts of the expanding fertilizer industry in the state.

Fertilizer Outlook

He said outlook for fertilizer materials for 1953 is good, with supplies expected to be up somewhat from those for 1952, with the exception of triple superphosphate, ammonium nitrate and, sulfate of ammonia.

Interesting papers on new chemical soil conditioners, industrial plant accident prevention and on the trend of fertilizer usage in the West were presented by the state Bureau of Chemistry.

Praise for the free enterprise system was given in the principal address before the convention by Dean Laurence Lockley of the School of Commerce, University of Southern California.

Expressing opposition to Federal planning of business, Lockley said we have reached a point where there is too much government interference with business.

The water development plan for California was outlined by T. R. Simpson, professor of Irrigation Engineering at the University of California, Berkeley.

Other talks on the fertilizer situation were given by Russell Coleman, president of the National Fertilizer Association; Paul T. Truitt, president of the American Plant Food Council and Z. N. Beers, executive secretary of the Middlewest Soil Improvement committee.

Tatem Elected

S. B. Tatem, Swift & Co., Los Angeles, was elected president of the association. Other officers include B. H. Jones, Sunland Industries, Inc., Fresno, vice president; Jack Baker, Wilbur-Ellis Co., Los Angeles, treasurer and Sidney H. Bierly, Los Angeles, executive secretary and manager.

James M. Quinn, California Sun Fertilizer Co., Los Angeles, was reelected to another three-year term on the board of directors. Howard G. Conley, Pacific Guano Co., Berkeley and Howard H. Hawkins, Golden State Plant Food Co., Glendora were named to three year terms on the board, replacing Ralph J. Crum, Pacific Guano and Charles Monoogian, Downey Fertilizer Co., Downey, who retired.

Industrial News

Many Manufacturers Attend Soil Conditioner Meeting; Some Absent

THIRTY-THREE formulators and manufacturers of soil conditioners attended the "First National Soil Conditioner Conference" in the Plaza Hotel, New York City, November 10, at the invitation of Henry A. Dreer & Co., Inc., which sponsored the meeting.

Most of the program was concerned with research conducted by Dreer to determine the effectiveness of the conditioners under various conditions.

Purpose of the meeting, as outlined by Richard A. Snelling, president of Dreer and temporary chairman of the conference, was to set up an organization in the new field and to inaugurate a series of trade practice conferences in the industry.

Although more than 200 persons attended the conference, few of those representing manufacturers and formulators had authority to commit their companies to membership in such an organization, Dreer officials reported. To facilitate the organization Snelling distributed membership applications to representatives to be taken back to the various companies for discussion.

First step in organization of an industry committee is the setting up of a three-man nominating committee, according to the temporary chairman.

Several large companies in the farm chemicals field were represented at the meeting, according to the registration list. These included Wilson Dye & Chemical Co., Hercules Powder Co., Rohm & Haas, Allied Chemical & Dye Corp., General Aniline & Film, B. F. Goodrich Chemical Co., American Polymer Corp., International Minerals & Chemical Corp., Stauffer Chemical Corp., and Pittsburgh Agricultural Chemical Co.

Not listed on the registration were Monsanto Chemical Co., which broke the news about its soil conditioner Krilium in December, 1951, to start the whirlwind field in motion and American Cyanamid, which also manufactures a conditioner.

Dreer Research

Research on the Dreer product Fluffium and other conditioners, labeled with code letters, was presented during the morning session by the Samuel P. Sadtler & Son Chemical laboratories of Philadelphia, and by the Soil Research Laboratories, headed by Dr. Wayne Arny.

Merchandising techniques were discussed at the afternoon session by Dr. Franklin Jones, chemical and horticultural consultant who reviewed his work with Dreer in marketing its product.

A talk by James A. Horton, director of the Bureau of Industrial Cooperation, Federal Trade Commission, on the value of trade practice conferences, concluded the formal program.

An open forum for presentation of research data by others attending the meeting followed. It was concerned, however, with a questioning of some of the statements made concerning the Dreer research. None of the other companies represented at the meeting presented any data on their products in the field.

Company Sponsored

Snelling said the meeting was organized and paid for by his company after other companies and state groups declined to sponsor or co-sponsor such a meeting.

He said the meeting was called in light of the "tremendous interest" in the conditioners and the many "conflicting claims" which have been made about them.

Gulf Sulphur Corp. Finds Deposit on Mexican Land

A fourth sulfur deposit has been found on Mexican properties of the Gulf Sulphur Corp., adding a considerable quantity of Frasch productible sulfur to the company's output.

Robert H. Van Doren, president of the sulfur concern, said that 52 feet of sulfur formation has already been cored and they are still drilling through sulfur. He stated that this latest development "fully justifies the confidence of Gulf Sulphur in the continuing sulfur richness of its Mexican properties."

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Industrial News

Monsanto Wins 'Oscar' for Best Annual Report

Monsanto Chemical Co. has received "Financial World's" gold Oscar for the best annual report of all industry. This marks the first time in the 12 years of competition that a chemical concern has been awarded the top prize.

Runners-up among chemical companies were Rayonier, Inc. and Dow Chemical. Allied Chemical & Dye received the silver Oscar for the best annual report advertisement and General Electric claimed a similar award for the best stockholder's annual meeting report.

In accepting the reward, Monsanto president Charles A. Thomas said that American business leaders must look far beyond their own plant gates and must "demonstrate their deep concern for the social and economic well-being of their society." He asked that concern for the American worker not be confined to his actual working period but that it be extended through his off-job hours.

Dr. Thomas stated his belief that the American people stand behind their economic system and that what they suspect is not the system but the philosophy and so-called economic exploitation behind it.

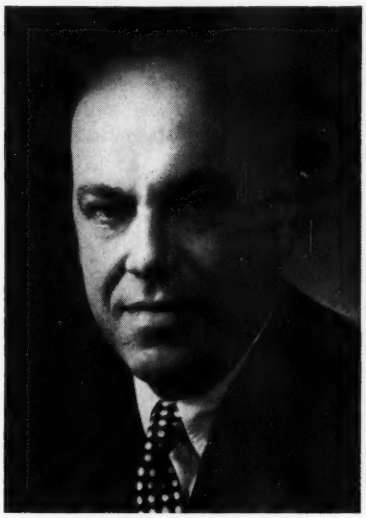
Pointing out that business leaders cannot be content with taking comfort in the unparalleled material benefits they have brought about he said, "We must go farther than that—farther than the material yardstick will measure."

"We want profits" he concluded, but in a climate of accord and understanding in which all have a sense of belonging.

ACS Award to Mallinckrodt

The St. Louis section of the American Chemical Society has presented its 1952 Midwest Award to Edward Mallinckrodt, Jr., chairman of the board of Mallinckrodt Chemical Works. The medallion is presented annually as public recognition for outstanding achievements in chemistry in the Midwest.

R. L. Hockley Succeeds Father



R. L. Hockley

C. F. Hockley

R. L. Hockley has been named president of Davison Chemical Corp. succeeding his father, Chester F. Hockley. The father has retained his position as chairman of the board of directors.

The elder Hockley assumed direction of the old Davison organization in 1933 as receiver and initiated the program of diversification into general industrial chemicals.

R. L. Hockley has been with the company since 1934 and largely implemented the diversification policy. One of his more outstanding accomplishments has been the erection of an industrial market for silica gel.

Fertilizer Committee Helps USDA With New Program

Suggestions for carrying out the national fertilizer and lime program were presented in a report by the fertilizer industry advisory group to the USDA-Land Grant College Fertilizer Steering Committee. These recommendations included:

1. Efforts to obtain fertilizer industry participation in the program should be organized at the state level with land grant institutions taking the lead. Meetings of the two should be arranged.

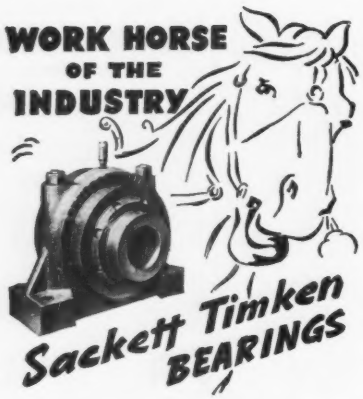
2. Steps should be taken as soon as possible to set up an advisory committee of farm equipment manufacturers to assure that the development of distribution machinery keeps up with the program objectives.

3. Demonstrations and contests, as a part of the over-all educational program, should be used more widely.

4. Special attention should be given to development of research programs aimed at more even distribution and use of fertilizers throughout the year to assure economy in efficient use.

5. Full support of newspapers, farm journals, radio, television and other media should be sought.

Members of the industry committee include: W. N. Watmough, Jr., Davison Chemical; P. H. Jones, Sunland Industries; A. R. Mullin, Indiana Farm Coop, Assn.; G. R. Petitt, Potash Co. of America; W. T. Wright, F. S. Royster Guano; J. R. Riley, Jr., Spencer Chemical; P. T. Truitt, APFC; and Russell Coleman, NFA.



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Industrial News

Herbicide Group Seeks Information on Exports

Members of the herbicide and defoliant chemicals IAC have recommended that NPA request, from other agencies, more definite information on exported weed-killers.

They also asked the agency to suggest to the Tariff Commission that specific monthly production reports be made on 2, 4-D acid and 2,4,5-T acid to eliminate duplication when statistics include salts, esters and amines.

In commenting on herbicide use, NPA told the committee that 2,4-D and 2,4,5-T production is currently in balance and that programmed facilities should be adequate for anticipated demands.

Officials stated that the use of sodium chlorate as a defoliant is probably 10–15 per cent of the total supply and estimated that it will amount to about 6–6.5 million pounds for 1952 and 7–8 million for 1953.

An Office of International Trade representative stated that exports of chemical weed killers amounted to 8.5 million pounds during the first eight months of 1952 with total exports for the year estimated at 10–12 million. These materials went chiefly to Canada, Cuba, Colombia, Venezuela, Peru, Argentina, British Malaya and Turkey.

The committee was told by a USDA official that about two million acres of cotton are expected to be defoliated during the year.

Production of Phosphate Rock Drops from '50 Total

A recent Bureau of Mines report shows that 1951 mine production of phosphate rock was nearly a third of a million tons less than the record high set in 1950. A total of 10,775,032 tons were produced with increases recorded only in western producing areas.

Sales increased to 11,095,204 tons, part of which came from stocks, with the greatest increases occurring in Florida and the west. Total value of rock phosphate sold or used rose to $66,158,078, better than seven million dollars above the 1950 level, a new record high.

The upward trend in marketed production of Florida rock continued, reaching nearly 8.5 million tons, with by far the greatest portion from land-pebble fields. Tennessee remained the second largest state in production although western production showed a considerable increase.

Both quantity and value of imports increased during the year and exports, although lower than 1950 in quantity, were higher in value. Apparent domestic consumption rose to a record 9,507,951 tons.

Larvacide Products, Inc., Buys Innis, Speiden Unit

The insecticide division of Innis, Speiden & Co. has been purchased by Larvacide Products, Inc., a new concern headed by Conrad C. Johnson. Johnson is former manager of the Innis, Speiden division.

Larvacide Products will supply all products previously furnished by the division and their Niagara Falls plant will continue to produce Larvacide (chloropicrin). Other items will be manufactured in a New York area plant.

George S. Hamilton, former treasurer of Innis, Speiden, is treasurer of the new company. Offices are to be maintained at 117 Liberty St., New York City.

Find Canadian Potash Beds

Large deposits of potash ore, extending over possibly 250 square miles, have been discovered in Saskatchewan, Canada near Vera and Unity. Full extent has not yet been determined but exploratory drilling indicates beds in varying thicknesses up to 11 feet.

Western Potash Corp., Ltd. is reported to have spent about a million dollars in exploring the sylvanite beds and a 3,450 foot shaft has been sunk.

The only other major deposit of potash ores on this continent is our own Carlsbad center. The discovery is of special importance to Canadian fertilizer manufacturers who import practically all of their mineral potash.

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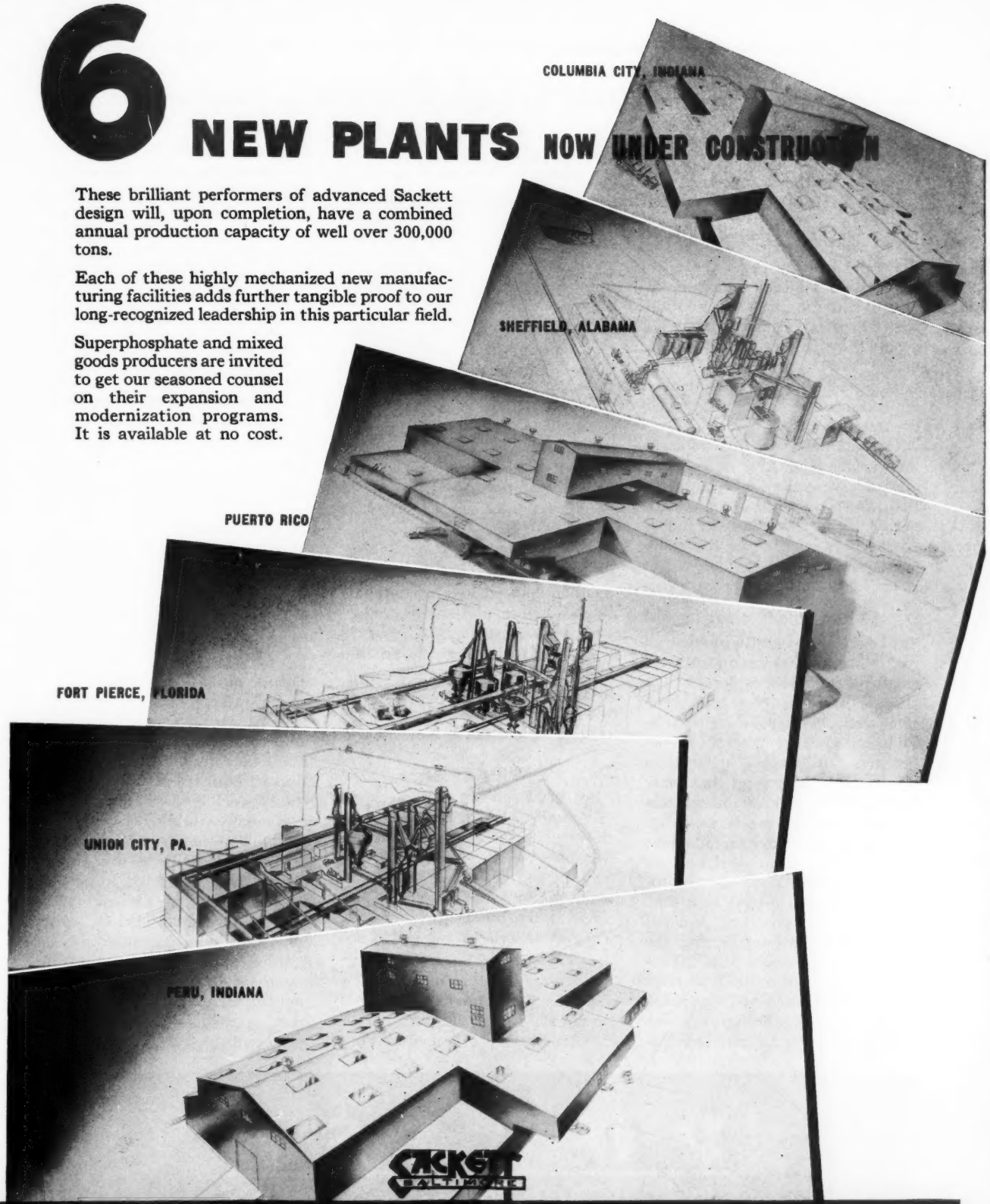

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Industrial News

Greenewalt Urges Expansion Of Research in United States

Crawford H. Greenewalt, Du Pont president, stressed the need for "expanding our reservoir of scientific information" in accepting the Chemical Industry Medal awarded by the American Section of the Society of Chemical Industry. The medal is awarded annually for conspicuous service to applied chemistry.

Contributions to fundamental knowledge made in universities abroad have until now been greater than our own, Greenewalt stated, permitting us to indulge our industrial genius without at the same time contributing our share of the world's fund of basic knowledge.

Research Needed

The medalist said that industrial research units can conduct only a small part of basic-exploration although the need for that type of investigation grows constantly. Pointing out that with all of the facilities DuPont has at hand, a given research project has only about one chance in 20 of becoming a commercial success, he said that it is essential to have an abundant flow of scientific knowledge if the odds are to be good enough for them to stay on the winning side.

The DuPont president deplored the trend toward minimizing the function and importance of the individual and said research progress in industry or university is still the product of human ingenuity.

He stated, "Industrial and academic science together must be free to question the old and embrace the new, to eliminate the wasteful and to crown the efficient."

Greenewalt, who has been with DuPont since 1922, rose rapidly in the company from his first position as chemist. As a research supervisor he was active in the development of nylon and its transfer from laboratory to pilot plant. In 1942 he was elected a member of the board of directors and research director of the Grasselli chemicals department.

In 1943 he was made technical director of the explosives department and played an important part in developing plutonium production on a plant scale. He was named to DuPont's executive committee in 1946, became vice chairman of the committee in 1947 and was named president of the industrial giant in 1948.

Swain Presents

Robert C. Swain, vice president of American Cyanamid, presented the medal to Greenewalt. Harry B. McClure, vice president of Carbide and Carbon Chemicals and chairman, American SCL section, presided at the dinner, held in New York's Waldorf-Astoria, and introduced the guests.

Guests of honor included Francis J. Curtis, Monsanto Chemical, SCI president; Irenee duPont; Walter S. Carpenter, Jr., former DuPont president; Lauren Hitchcock, vice chairman, SCI American section; E. J. Durham, chairman, New York section, American Chemical Society; Karl Herstein, chairman, New York chapter, American Institute of Chemists; Frank White, head, New York chapter, American Institute of Chemical Engineers and F. W. Adams, secretary, SCI American section.

Pan-American Sulphur Plans to Build New Plant

Financial arrangements have been completed for construction of a five million dollar sulfur plant by Pan American Sulphur Co. at Jaltipan in southern Veracruz, Mexico.

Construction is expected to commence shortly after Feb. 1, and the completion date has been scheduled for August, 1954. The plant will be located on concessions of about 22,000 acres on and around the Jaltipan salt dome and will be capable of 300,000 to 600,000 tons annual production.

Plans for financing the unit include an eight year $3,664,000 loan from the United States Export-Import bank plus an offering of equity stock of about three million to company stockholders.

It will be the first Frasch process sulfur plant outside the United States and is expected to provide Mexico with a new national industry, one that could lead to further important industrial expansion.

Officers and directors of the company are largely independent oil men turned sulfur wildcatters. Both plant construction and operations will be manned by Mexican labor.

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Industrial News

Harte Gets Davison Granulation License

Davison Chemical Corp. has granted the John J. Harte Co. non-exclusive rights to license manufacturers to use the Davison process for the production of granulated fertilizers.

In making the process available to others in the fertilizer industry, Davison felt that an engineering organization with experience in the fertilizer industry was best suited to facilitate licensing agreements.

USDA Predicts Fertilizer Price Hikes for Farmers

USDA economists predict fertilizer costs to farmers will increase some three to four per cent next year.

This is expected to result from the recent OPS action permitting adjustments in prices to reflect higher freight rates.

Retail prices of pesticides probably will remain at about the same level, according to the economists, but they warned that farmers should make known their needs so demand can be anticipated by formulators and distributors.

Estimates for '53

These were estimates given to those attending the 1953 outlook conference of federal and state extension service and the Bureaus of Agricultural Economics, Human Nutrition and Home Economics.

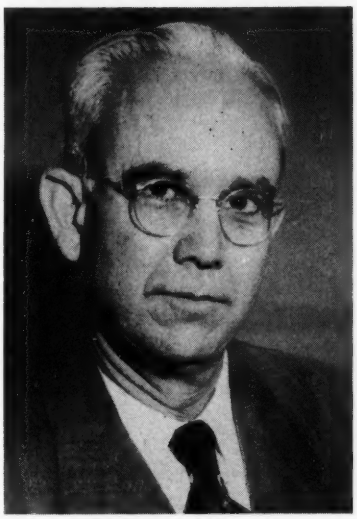
Commenting on the pesticide situation, they pointed out that the problems of distributing pesticide formulations have become highly complicated and it is no longer possible to manufacture and distribute all the pesticides needed for farm use within a few weeks before they are actually applied.

Fertilizer Price Hike

The increases in fertilizer price will be felt mainly in the west and midwest, they stated.

Prices in other areas, especially the southeast, probably will change very little.

New Vice President



George W. Moyers

George W. Moyers has been elected vice president in charge of the phosphate division of International Minerals & Chemical Corp. by the board of directors. He fills the vacancy caused by the resignation of Franklin Farley.

Mr. Moyers has been with IMC for 25 years and subsequent to his present position was sales manager of the division. He has been responsible for handling all of the negotiations of the corporation's large sales contracts in the phosphate division.

At their meeting, the directors also re-elected all other officers of the corporation.

Illinois Farm Supply Using Surface Agents

Illinois Farm Supply Co., Chicago, seems to have stolen a march on the remainder of the industry by developing a process of using surface active agents in its Gro-Flo fertilizer.

The company selected Santomerse No. 1, an anionic wetting agent from Monsanto Chemical, for use in manufacturing Gro-Flo. Prime advantage of the new plant food is its free flowing characteristic.

Research was carried out under the direction of James E. Seymour, research chemist of the company.

NPA Lists Rules On Sulfur Usage

On November 5, NPA lifted its restrictions on sulfur usage and inventories with the revocation of Order M-69. For the first time in 17 months supplies were said to be equal with demand.

Late in August NPA relaxed inventory controls in recognition of improved supplies and at a previous sulfur industry advisory committee meeting members suggested that limitations on use and inventories be lifted.

Both the International Materials Conference and the State Department opposed lifting of controls while sulfur is under international allocation.

NPA asked consumers to continue sending reports and the Bureau of Mines sent letters to producers describing the reports they now will be required to file. Reporting requirements will remain generally the same as they were under M-69.

L. M. Williams, Jr., Freeport Sulphur president commented that the handling of the sulfur shortage was an excellent example of teamwork between government and industry in the national interest.

New Ore Process

A new method of refining ore, called the LeBaron-Lawver process, has been developed by International Minerals & Chemical Corp., Louis Ware, president of the company, announced late last month.

The process is applicable to potash and phosphate as well as many other types of ores, Ware stated.

The method was developed under the direction of Dr. Paul V. Manning, vice president in charge of research and Dr. I. M. LeBaron, director of International's research labs.

International will build a larger pilot plant at the site of the Carlsbad refinery to treat semi-commercial quantities of potash by the new method.

Industrial News

DuPont Workers Safest at Jobs

With so much talk about industrial safety, it's hard to believe that in some places workers are safer at their jobs than they are at home—or any other place.

But that's the case at DuPont, according to a recent company bulletin called "The Story of Safety."

The publication states that DuPont's employes, even those handling high explosives, are nearly four times as safe at their jobs than elsewhere.

The booklet describes how DuPont's injury frequency rate has been cut more than 93 per cent—from 10.3 injuries per million man-hours worked in 1926 to 0.67 injuries per million man-hours worked in 1951. Had this improvement not taken place, at least 31,000 injuries which never happened could have occurred over the 25-year period.

Of the company's 114 plants, laboratories and construction projects, 75 completed 1951 without a single time-losing injury. Three of these each have gone 22 years or more with a perfect record.

Basic principle of DuPont's safety performance, the booklet points out, is simple: Safety is the responsibility of management, in all phases and at all levels of organization. Every member of supervision, from the newest foreman to the top level authority, is responsibile for the safety of men and women working with him. Safety practices, subject to continual attention and revision, attempt to anticipate every possible risk which may arise, on the theory that well-trained persons, using every available precaution, can avoid all personal injuries.

Built-in safety in plant construction, a wide variety of protective clothing and many ingenious devices are parts of the mechanics of safety, which have led to the result that only one out of 10 injuries now is caused by failure of equipment or processes; the other nine may be traced to human error.

And DuPont research is seeking means to reduce human error. Scientists are examining significance of emotional attitudes, fatigue, discontent and other psychological factors in an attempt to learn why, for example, a machine operator, against warnings removes his safety gloves or glasses.

"Whether in the shadowy area of the human mind or in the more tangible realm of the body," the booklet says, "research's role is to see that no cause remains without its cure."

"Rules, ordinances and regulations," the booklet says, "have played their part in setting standards and defining uniform practices, but safety has not been achieved by the letter of law any more so in industry than on the highway, where a vast body of laws and limits has failed to avert accidents. Safety on-the-job has come because industry well recognizes that it pays attractive dividends."

SULPHURIC ACID
and
FERTILIZER
PLANTS

Phosphoric Acid
Concentrators
Ammonia Oxidation
Nitric Acid

NICOLAY TITLESTAD
CORPORATION
11 WEST 42nd STREET NEW YORK 18, N. Y.

Pioneer Chemical Offers Materials For Insecticides

Pioneer Chemical Associates is offering a complete line of raw materials and concentrates to insecticide formulators.

J. Newton Hall, former vice president for sales of Julius Hyman & Company and now general manager of Pioneer, has announced that the Denver company is expanding its line to include raw materials and concentrates of herbicides and rodenticides, as well as sulfur, diluents and emulsifiers.

Miss Herbst Appointed For Krilium Promotion

Margaret Herbst has been appointed a consultant in public relations activities concerning Krilium soil conditioner and other products handled by Monsanto Chemical Company's Merchandising Division.

Miss Herbst's activities in the horticultural field will be concentrated primarily in the eastern United States. She will report to the department of advertising and public relations at Monsanto's headquarters in St. Louis, the company reported.

Reprints Available

Several hundred reprints of the article "Fertilizer Mixing Problems," by Dr. Vincent Sauchelli and R. P. Taylor, of Davison Chemical Corp., which appeared in the September FARM CHEMICALS are available for readers of the magazine at five cents each.

This magazine frequently reprints articles for readers. Rates depend on number of pages and total quantity printed. If you are interested in reprints of an article contact the magazine by the twentieth of the month in which it appears.

Industrial News

Potash Deliveries Up in 3rd Quarter

A jump of 14 per cent in potash salts and 15 per cent in K_2O delivered during the third quarter of the year was reported by the American Potash Institute.

The six major American producers delivered 664,389 tons of salts containing an equivalent of 385,993 tons of K_2O during the period.

Agricultural deliveries in the United States, Canada, Cuba, Puerto Rico and Hawaii totaled 630,631 tons of salts, equivalent to 365,052 tons K_2O. This was comprised of 567,134 tons of muriate of potash, 1,241 tons of manure salts and 62,256 tons sulfate of potash and sulfate of potash-magnesia. Chemical industries took 33,460 tons of muriate of potash and sulfate of potash, containing an equivalent of 20,772 tons of K_2O.

Exports outside North America were 298 tons of salts containing 170 tons K_2O.

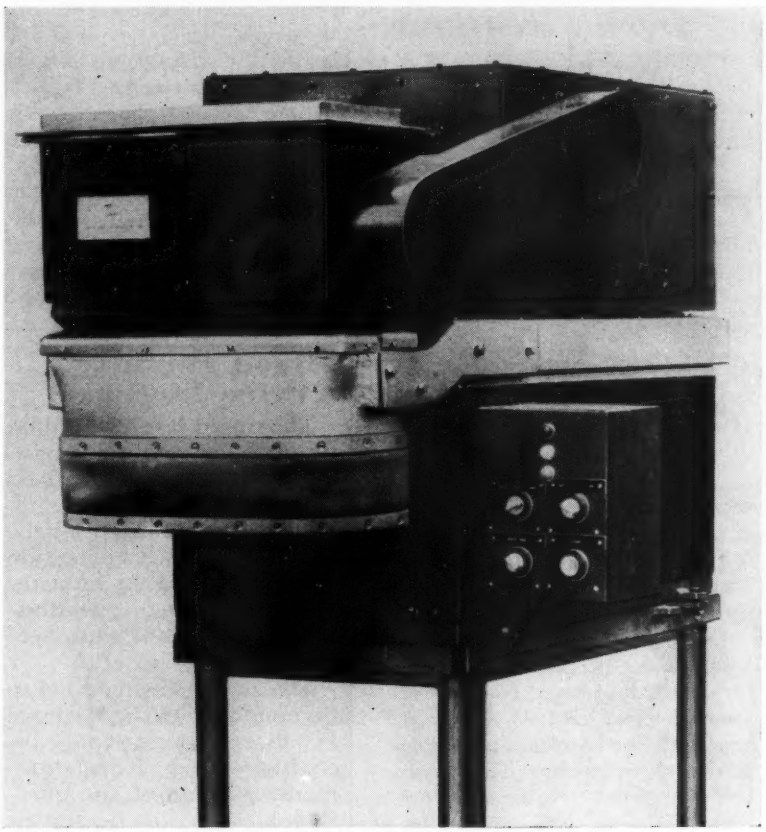
Total deliveries by United States producers and importers during the first nine months were 2,225,323 tons of potash salts containing 1,284,858 tons K_2O, an increase of 7 per cent in salts and 8 per cent in K_2O over the corresponding period in 1951. Potash for agricultural use in the United States, Canada, Cuba, Puerto Rico and Hawaii amounted to 1,220,437 tons K_2O contained in 2,121,538 tons of salts of which 1,907,339 tons were muriate of potash, 6,532 tons manure salts and 207,667 tons sulfate of potash and sulfate of potash-magnesia—an increase of 9 per cent in salts and 10.5 per cent in K_2O.

Groggins To Retire After 26 Years In Government

At the end of this month P. H. Groggins will retire after 26 years of government service. Groggins is very well known to our industry and currently is chief of the NPA Agricultural Chemicals Section.

In a letter to NFA president Russell Coleman, he stated that he is planning to do a limited amount of consultant work.

12-21 Thayer Filling Scale



Theyer automatic filling scale, model 600G

A new filling scale which automatically holds, fills, checkweighs and releases up to six bags of material a minute has been designed by Thayer Scale and Engineering Co.

It is intended for use with insecticides, resins, clay, powders and other light materials, according to the company.

An important feature of the machine is that it operates within weight tolerances of plus or minus two ounces or less of any desired weight from 25 to 200 pounds.

The machine is called Thayer Model 600G Filling Scale. It has an air-operated bag-holder, dust-tight construction and a shock-proof leverage system which has no knife-edge pivots subject to wear.

A combination gravity and rotary feeding system also is featured on the scale, the company states.

For further details fill out a **Reader Service** card, using code number **12-21**.

Attapulgus Sold

Attapulgus Clay Co., of Philadelphia, was dissolved and liquidated Nov. 26, when assets of the company were sold to Minerals Separation North American Corp., of Chicago.

The company's former business will be handled by Attapulgus Minerals & Chemical Corp., with the same management. During the present interim period the company is operating as Attapulgus Clay Division of Minerals Separation.

Industrial News

Industry Men Help In Grain Demonstrations

Industry representatives aided in demonstrating the importance of cleaning up grain storage bins to farmers in Iowa last month.

Necessity for keeping grain storage facilities clean and free from insects long has been stressed by Food and Drug Administration officials but the practical demonstration brought the message home emphatically.

Feature of the demonstration was a cleaning job done on a grain bin by Wright Tree Service Co., of Des Moines. After using a huge vacuum cleaner to clean the bin the employes sprayed the walls with an emulsifiable formulation of methoxychlor.

These fundamental points of importance to the drive for cleaning up the national granary were made:

1. Elevator operations are the segment of the grain industry under greatest pressure to clean up their premises by 1953 in accordance with Food and Drug Administration requirements. This will in turn mean that elevator operators, with their own bins cleaned up, must demand clean grain from farmers and clean railroad cars for shipment.

2. Although farmers can clean and spray their own grain bins adequately, the larger storage facilities of both country and terminal elevators require special equipment. Heavy layers of grain dust, in which destructive insects thrive, form on walls and in cracks of storage bins. Brooms cannot clean this debris out. Compressed air blasts will dislodge large particles, but fine dust is merely driven farther into openings. Special suction equipment seems the best answer.

3. Methoxychlor was used in the demonstrations because it combines safety from toxic hazard with long-time residual activity to a greater extent than other insecticides approved for bin spraying.

WANTED

Urea 46% Nitrogen

Truckloads or Carloads

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1345 Arch St.,
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RIttenhouse 6-6592

Mixed Fertilizer Price Increase?

The mixed fertilizer industry may be granted an increase in ceiling products next spring.

This was indicated by the Office of Price Stabilization when it mailed an industry earnings survey questionnaire to 32 manufacturers of mixed fertilizers Dec. 5.

The action was reported to its members by the National Fertilizer Association. According to an NFA statement, purpose of the questionnaire is to determine whether the mixed fertilizer industry can qualify for an increase in ceiling prices because of the higher cost of raw materials and other cost increases.

The mixers being questioned are of all sizes and are said to be a representative sample of the industry as a whole.

New Lindane Mixture

An insecticide mixture effective twice as long as normal lindane sprays has been announced by the U.S.D.A.

It is a mixture of lindane and chlorinated polyphenol, that retains its power to kill susceptible insects much longer than a regular lindane spray, the department reported.

An added feature of the new compound is that it won't leave whitish deposits on surfaces.

Chase Bag Co. Appoints Three To New Posts

Three Chase Bag Co. appointments were announced by the company last month.

Ralph Farnham was moved up to Southern promotion manager, James F. Floyd was appointed salesman in the Orlando district and Bud E. Simonton was named superintendent of the Toledo factory.

Farnham, who had been manager of the Orlando branch, will continue to operate from that office. He has been with Chase since 1934. Prior to his assignment as Orlando manager in 1944, he served as salesman in the New Orleans area.

Farnham

Floyd served formerly as Orlando office manager and has been with Chase since 1946.

R. N. Conners, general sales manager, announced the first two appointments.

Simonton's appointment was announced by F. H. Ludington Jr., assistant vice-president.

Floyd

Simonton has many years experience in the paper bag industry. He was associated formerly with Union Bag Company and served recently as superintendent of several bag plants for St. Regis.

Simonton

John F. Hilarski, assistant superintendent, will assist Simonton and continue to be responsible for the textile bag operation at Toledo.

Industrial News

Battelle Opens New Research Center for German Industry

Cornerstone for a new Battelle Memorial Institute research center at Frankfurt on the Main, Germany, to serve the industry of that country, was placed Oct. 31. The institute for Germany is being established by Battelle Memorial Institute, research foundation at Columbus, O.

Battelle is establishing another research center at Geneva, Switzerland and has set up a program of fellowships for selected students in the universities of both Switzerland and Germany, director Clyde Williams announced. In addition, research centers and fellowship programs for other countries of Western Europe are contemplated.

The Frankfurt research center will engage in chemical, metallurgical and engineering research. It already is under construction on a site presented for the purpose by the city of Frankfurt. The laboratory will cost approximately a million dollars. Another half-million will be required to equip it.

Battelle-Frankfurt has been licensed by the Bonn government to operate as an "eingetragener Verein," or as a nonprofit organization.

"The accumulated experience in the planning and conduct of research gained through Battelle's 23 years of service in America can do much to help industry in Europe increase its productivity and expand its markets," Dr. Williams said.

"At the same time, establishment of research projects in Europe will create increased opportunities for European scientists and engineers to work more effectively in their chosen fields. They will thus contribute more fully to the welfare of their respective countries."

The Frankfurt laboratories are scheduled to be completed by late spring of 1953. The physical plant will consist of two major buildings, a four-story building 279 by 85 feet and a three-story building 279 by 92 feet. They will be connected by a three-story bridge. Another one-story building, independent of the other units, will be constructed to house heating and pumping equipment.

Battelle in Europe has offices in Geneva, Switzerland and has an engineering economics group working on industrial surveys. It is preparing laboratory facilities on a 16-acre plot. The Swiss laboratory, which formerly housed medical research, is being remodeled and is scheduled for completion and occupancy early next year. Initially a staff of fifteen will be housed there.

Some Soil Conditioners Highly Effective—USDA

The best of the new chemical soil conditioners are highly effective agents in stabilizing whatever structure of soil has been prepared.

That is the report, based on short-term evaluation tests, of the U. S. Department of Agriculture.

Dr. R. Q. Parks, head of the division of Soil Management and Irrigation Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering, made these points:

1. Conditioners hold unusual promise in certain soils for preventing soil crusting and for erosion control.

2. In studies at the U. S. Salinity Laboratory at Riverside, Cal., some of the compounds showed a marked influence in improving both non-saline-alkali and saline-alkali soils under irrigation.

3. Usefulness of the new compounds is in stabilizing soil structure. For best results, according to Dr. Parks, they should be applied to a well-prepared seedbed and the soil then thoroughly mixed.

He said spraying a soil conditioner on a heavy baked clay without cultivation cannot be expected to improve soil structure.

Preliminary screening tests were made with 28 conditioners.

Sales Manager

W. F. Nesbit

W. F. Nesbit has been appointed sales manager of the eastern division of Arkell and Smiths.

Nesbit formerly was a Southern division sales representative with the multiwalled bag manufacturers in the Texas area.

His headquarters will be in the New York City sales office.

FTE Distributors

Fritted trace elements produced by Ferro Corp. of Chicago will be distributed by DuPont, the Chicago firm reported last month.

The trace element material, called FTE, offers a new method for supplying minor elements to crops in a safe and efficient manner.

(Development and application of fritted trace elements by the company was described in a FARM CHEMICALS article in the August, 1952 issue.)

DuPont will handle all retail marketing of the product, according to Ferro. The manufacturer will market FTE directly to major fertilizer manufacturers, the company stated.

. . . NFA Fall Convention at Miami Beach

(*Continued from page 24*)

buffet dinner served Thursday evening. It was preceded by an open house sponsored by H. J. Baker & Bro. and followed by excellent entertainment provided by a group of Miami Beach girls who performed in the Surf Room of the Roney Plaza.

Heading the ladies hospitality committee was Mrs. C. E. Reger. H. B. Fultz was chairman of the men's committee.

Many members supplemented their "Southern vacations" with post-convention trips to Cuba, Nassau and the Florida Keys.

The NFA convention in Miami Beach offered members and their wives an unusual opportunity to combine business with pleasure. All meetings of the sessions were well attended and the recreational facilities were enjoyed by all.

* * *

Rain dampened things on Thursday (even the fish apparently went in out of the rain) but the weather cleared for the final day of the meetings and fishing and golf went off as scheduled.

* * *

Many of the conventioneers took advantage of the "longest beachfront in Miami Beach" during the convention, but, like the girl who hung her clothes on the hickory limb, they didn't go near the water.

Jim Totman and a few others splashed around in the briny deep but most members preferred to lounge in the beach-front cabañas or on the sun deck of the cabaña restaurant, along with Gov. Thomas E. Dewey (who also was resting up from a hard season.)

* * *

While the men were enjoying outdoor sports the women had a luncheon and fashion show in the Roney Plaza.

The luncheon and show had been scheduled for the Patio Gardens until the weather man defied the Florida Chamber of Commerce.

* * *

Unwilling to give up their place in the sun, many conventioneers packed their bags for Cuba, Key West, Nassau and points South. All agreed the convention was one of the best in recent years. ◆

Metabolism May Be Key To Plant Disease Control

In controlling plant disease an important factor may be changes in plant metabolism. That was reported by Dr. David Davis, of the Connecticut Agricultural Experiment Station before the American Phytopathological Society.

Dr. Davis pointed out in two papers that the changes in plant metabolism may be the key to action of plant chemotherapeutants in checking diseases.

Evidence was presented a year ago by another Connecticut staff member, Dr. W. Graham Keyworth, which pointed in that direction.

Dr. Keyworth found that many of the more effective chemotherapeutants, which are watered on the soil and taken to interior portions of the plant, injured roots of the plants they were protecting. He found further that such root injury altered the metabolism of the plants and produced marked changes in their soluble sugar contents.

The experiments of Dr. Davis provide further proof of the theory. In the first experiment he found that a new experimental compound, No. 1182, made tobacco plants more resistant to the tobacco mosaic virus, at the same time altering the plant's water-soluble nitrogen content and their metabolism.

Tobacco plants given 10 daily soil applications of 1182, then inoculated with mosaic virus were much more resistant to the disease than the control plants which received no treatment with the chemical but were inoculated with the virus, he found.

When the mosaic virus was put in culture solution and subjected to 1182 it was not inactivated, indicating to Dr. Davis that the effect of the chemical is not on the virus but on the tobacco plant—that it changes the plant's metabolism and makes it resistant to the disease.

In another experiment using growth regulators, similar results were obtained, he reported to the society.

Used for the tests were tomato plants infected with Fusarium wilt. A dilute solution of 2, 4-D controlled the wilt completely when applied 10 days before the plants were inoculated with Fusarium fungus.

When applied four days after inoculation, however, wilt was reduced only slightly.

H. B. Siems, Research Director of Swift Dies

An important leader in the fertilizer industry died Nov. 22.

Dr. Herman B. Siems, director of research in the Plant Food Division, Swift & Company, succumbed from a heart attack. It came while he was introducing speakers at the Cincinnati meeting of the National Joint Committee on Fertilizer Application.

Dr. Siems had been active in NFA's Plant Food Research committee, which he headed for many years.

He was active on other NFA committees and served on the State Relations Committee of the Association of Official Agricultural Chemists.

He was born in Nebraska in 1895, was graduated from the University of Chicago and joined Swift in 1924. He was a pioneer in the development of anhydrous ammonia for farm use, and worked on the early development of his company's product Vigoro.

Dr. Siems also headed the Fertilizer Division of the American Chemical Society for many years.

Buyers' Guide

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AGRICULTURAL CONSULTANTS
Bailey & Lerch, Washington, D. C.

ALDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

AMMONIA—Anhydrous and Liquor
Commercial Solvents Corp., New York City
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

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American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM PHOSPHATE
American Cyanamid Co., New York City
Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE
See Sulfate of Ammonia

AMMONIUM SULFATE NITRATE
Baker & Bro., H. J., New York City

BAGS—Burlap
Bemis Bros. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Multiwall-Paper
Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago
International Paper Co., Bagpak Div., N. Y. C.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Hudson Pulp & Paper Corp., N. Y. C.
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Mente & Co., Inc., New Orleans, La.
Raymond Bag Co., Middletown, Ohio
Union Bag & Paper Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES
International Paper Co., Bagpak Div., N. Y. C.

BAG CLOSING—THREAD & TWINE
Bemis Bros. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAG FILLING MACHINES
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BHC AND LINDANE
Ashcraft-Wilkinson Co., Atlanta, Ga..
Commercial Solvents Corp., New York City
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Tennessee Products & Chem. Corp., Nashville, Tenn.

BONE PRODUCTS
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—Hoist, Crane, etc.
Hayward Company, The, New York City

CALCIUM ARSENATE
American Agricultural Chemical Co., N. Y. C.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

CARS AND CART
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CHLORDANE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

CLAY
Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

CONTROL SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

CONVEYORS—Belt
Sackett & Sons Co., The A. J., Baltimore, Md.

COPPER SULFATE
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa

CYANAMID
American Cyanamid Co., New York City

DDT
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

DIELDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.

DILAN
Commercial Solvents Corp., New York City

DILUENTS
Ashcraft-Wilkinson Co., Atlanta, Ga.

DITHIOCARBAMATES
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS—Bucket
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., N. Y. C.
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER—Mixed
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FILLERS
McIver & Son, Alex. M., Charleston, S. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Tennessee Corp., Atlanta, Ga.

HERBICIDES
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.

HERBICIDES—Oils
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind..

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corp., New York City
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Powell & Co., John, New York City
Tennessee Products & Chem. Corp., Nashville Tenn.
Virginia-Carolina Chemical Corp., Richmond, Va.

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

LEAD ARSENATE
American Agricultural Chemical Co., N. Y. C.
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American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Sackett & Sons Co., The A. J., Baltimore, Md.

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MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MANGANESE SULFATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, New York City

MINOR ELEMENTS
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic
American Agriculture Chemical Co., N. Y. C.
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Spraying Systems Co., Bellwood, Ill.

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McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.
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Monsanto Chemical Co., St. Louis, Mo.
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Chemical Construction Corp., New York City
General Industrial Development Corp., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation Nicolay, New York City

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Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, New York City
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.

POTASSIUM PHOSPHATE
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Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SACKING UNITS
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Sackett & Sons Co., The A. J., Baltimore, Md.
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SOIL TESTING APPARATUS
La Motte Chemical Products Co., Baltimore, Md.

SOIL CONDITIONERS
American Polymer Corp., Peabody, Mass.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
United States Steel Corp., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Texas Gulf Sulphur Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
McIver & Son, Alex. M., Charleston, S. C
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
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International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TEPP
Monsanto Chemical Co., St. Louis, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

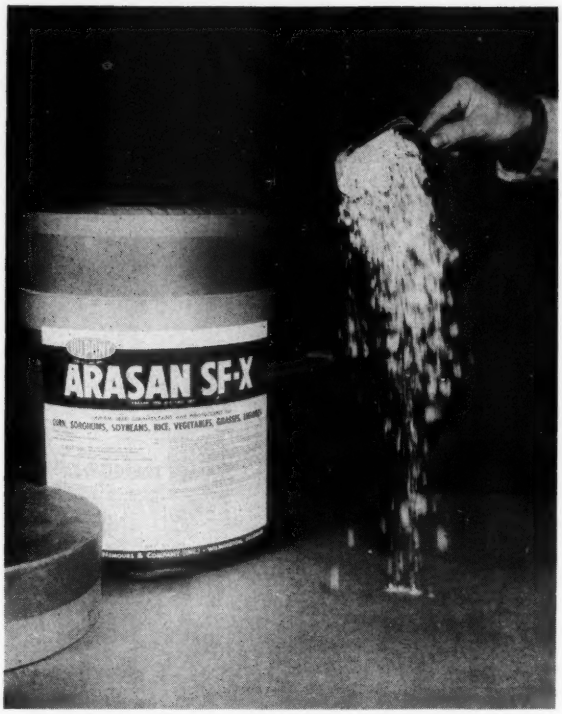
2, 4-D
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

2, 4, 5-T
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

UREA & UREA PRODUCTS
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.



No dust flies from the scoop of Du Pont's new formulation of Arasan SF-X, a slurry seed treatment

Dustless Seed Coating

A "DUSTLESS" seed treatment for slurry application—something new in the farm chemical field—has been developed by Du Pont.

One drawback to that company's "Arasan" had been the irritation of flying dust in seed treating plants, in handling treated seed in storage warehouses and in the field at the time of planting.

That problem has been removed by development of a new formulation announced late last month by Du Pont. The dustless material is called Arasan SF-X.

Effectiveness Is Retained

It can be used without sacrificing any of the effectiveness of Arasan, which has been recommended by experiment stations throughout the country, the company reports.

The new formulation is adaptable also for dry treatment of grasses and small-seeded legumes when used in blending equipment.

Protection against both seed-borne and soil-borne disease organisms is given with Arasan. The material is based on thiram, an organic sulfur compound and is recommended for seed of corn, soybeans, peas, grasses, legumes and most vegetable crops.

Long Series of Tests

To make sure the new formulation really is dustless, Du Pont has conducted a series of tests dumping the material from package to package to see if the coating sticks to the seed.

In dry form it can be measured into seed blenders along with grass and legume seed so pasture mixtures can be blended and the seed treated simultaneously. ◆

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Three Questions

THREE important questions stand out in looking back at the recent "First National Soil Conditioner Conference" in New York City:

1. Why was nearly the entire program at the conference devoted to a presentation of research statistics on the Dreer soil conditioner "Fluffium," and on its development and marketing?

2. Why were some of the major formulators of soil conditioners, who are fellow pioneers in this important agricultural field, not present at the meeting in the Plaza Hotel?

3. Why didn't those representatives of soil conditioner manufacturers and formulators who attended the meeting present their research findings for the benefit of the others present?

The answer to the first question is easy. Henry A. Dreer, Inc. sponsored and paid for the meeting and all expenses connected with it. The company arranged the program, invited the speakers, sent out invitations to industry personnel, then picked up the check.

But Richard A. Snelling, president of Dreer, who acted as temporary chairman of the meeting, did not hide this fact. He stated that Dreer sponsored the meeting by default after other groups had refused to do so.

"I agree that it would have been far better for the quicker understanding of this subject," Snelling said, "if this meeting had been impartially or co-partially sponsored." He went on to give the reasons for calling the meeting in the following statement:

"Because we feel deeply concerned with the future of this science and this industry, we had sought to bring about such impartial sponsorship of a meeting of this type. We wish to end the tendency for information on this subject to be presented by one competitor without others present, or even on the basis of the conclusions of one scientific group without the chance of debate by those with other findings or conclusions.

"In this effort we invited the four largest merchandisers and producers of chemical soil conditioners to mutually sponsor this forum; all declined. We asked several state universities to sponsor such a meeting, to arrange and to lead it, and we offered to pay all the costs; they declined.

"Under the circumstances the choice was between continuance of these disorderly processes of fact finding, or calling the meeting ourselves."

The answer to the second question, the reasons for the absence of several of the major manufacturers and formulators in the new industry, is not so easy to find.

Snelling said one commercial organization which was invited to the meeting said it was not attending because it wanted to protect certain possible patent positions.

He said several other companies and one state university demurred because they thought the subject was too new for worthwhile discussion.

There may be some validity to these claims. But more likely the companies stayed away because they thought the conference was "rigged" by Dreer to publicize its product and strengthen its position in the growing field of soil conditioners.

IT IS true that these companies were offered the opportunity to present their views of the subject, even if they differed with those of the sponsoring company.

"You are invited to attend this conference and present your views either through a formal brief or in open discussion," the invitation stated.

It is likely, however, that some companies regarded this merely as a gesture on the part of the sponsors to excuse the presentation of their own research.

Thus in the "open forum" period, provided for the convenience of other companies in presenting new information on soil conditioners, the representatives chose instead to contest many of the data presented by Dreer research officials.

Whatever the situation surrounding the calling of the conference the industry could profit greatly from an organization representing all manufacturers and formulators of soil conditioners.

Despite a few moments of petty wrangling at the recent conference, most of the discussion was on a high level and statements and claims were restrained and conservative. As one member of the press asked (rhetorically, no doubt), "Has publicity and advertising concerning the conditioners reflected the sensible statements made at this meeting?"

The answer to that one, in many cases, must be an emphatic **no.** That's the best reason we know for the formation of a permanent organization for soil conditioners. Both the industry and the public stand to gain.

—HAMILTON C. CARSON

May we take this opportunity to wish all of our friends a joyous and happy holiday season.

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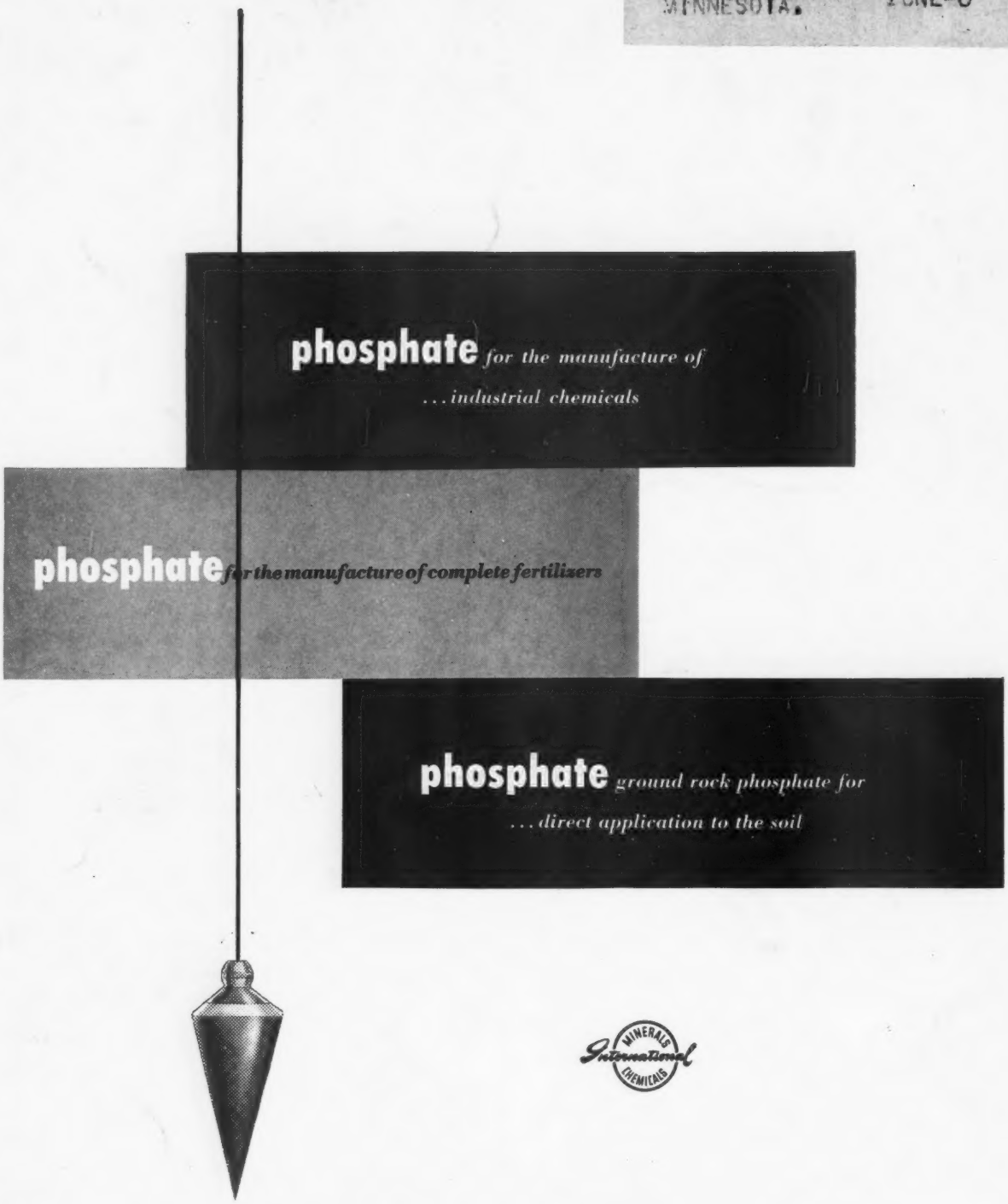

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